August 5, 1937

THE IRON AGE

AGRICULTURE-ENGINEERING LIBRARY
LIBRARY
WEST VIRGINIA UNIVERSITY

MUCH LONGER LIFE FOR THREAD GAGES

1 VERY HARD NITRIDED CASE

2 CASE 25-30 THOUSANDTHS THICK

3 TOUGH, DUCTILE, SHEFFALOY CORE

A special patented modification of long cycle nitriding, to which Sheffield has exclusive rights for thread gages, gives the gage surface a hardness of between 700 and 1100 Brinell. • Sheffaloy, the steel for these gages, was developed for this purpose. It possesses strength but is relatively soft and ductile and the core of the gage retains these characteristics after nitriding. Thus the Sheffield Thread Gage combines all the advantages of maximum hardness with durability and toughness. It does not crack or splinter and the hardened case will not check or flake. Likewise, breakage or cracking of the shank, encountered in a gage hardened throughout, is practically eliminated. • Unlike other nitrided thread gages, the Sheffield Gage is finish ground after nitriding—this for two important reasons. A nitrided case is harder just below the surface than it is on the surface itself. Grinding off the outer skin takes advantage of this. Nitriding, when done thoroughly, produces some distortion. Grinding after nitriding results in the high degree of precision that has been characteristic in the development of "the good name of Sheffield." • An order of Sheffield Thread gages will demonstrate their ability to provide unmatched performance.

SHEFFIELD GAGE CORPORATION
Dayton, Ohio, U. S. A.
MASTER GAGEMAKERS

TO THIS UNITED STATES

AG-ENG LIB.
ENG
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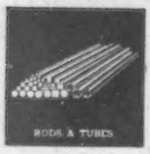
no.6
Ag.5,1937

WE INTRODUCED A NEW METAL

Phosphor Bronze

IN SHEETS, INGOTS, RODS AND TUBES, WIRE, CASTINGS, ROPE, BUSHINGS



The thirty-six States of the Union were hotly debating the relative Presidential merits of Hayes and Tilden . . . Napoleon had just withdrawn the last of the French troops in Mexico and Maximilian had toppled . . . Custer's "last stand" was NEWS, not history, when the founder of this company brought one of Industry's most valuable metals to the United States.

From that time forward, the Phosphor Bronze Smelting Company has been the leading source for this quality metal—engaging in the production of ***Phosphor Bronze***, only, for more than sixty years.

This pioneering effort and lengthy service to Industry, we emphasize. Not to brag particularly, or to wreath laurel in our brow. But, rather, to suggest to you that such continued successful effort in the production of this one metal must certainly qualify us to advise you as to its applications to your needs . . . and to supply you with the finest quality Phosphor Bronze—tough, flexible and resistant to corrosion—marketed under the dependable name, ELEPHANT BRAND.

We invite your inquiry and assure prompt, courteous attention.

THE PHOSPHOR BRONZE SMELTING COMPANY, 2210 Washington Ave., Philadelphia, Pa.

More accurate heat treatment with VisControlled Steel

BY the time parts reach the heat-treating department, they carry with them a heavy investment of time. Hence failure of the steel here—failure of individual pieces to respond to a mass-production heat-treating cycle—means more than just the loss of material.

VisControl, a Bethlehem development, enables us to produce—heat after heat—a steel which responds to heat treatment with remarkable uniformity. This uniformity is an outstanding characteristic of VisControlled Steels—uniformity not only in analysis and grain size, but also in certain other qualities that play a hidden yet important part in heat treating. Qualities influenced by such technical considerations as oxidation of the steel as it is being refined; amount and accuracy of finishing additions.

Practically all Bethlehem steel—for forging, machining, heat treating or other processing—is now made under this exclusive process. Try this steel—see if you don't find, as others have, a marked improvement in the quality of your product along with a material reduction of rejections.

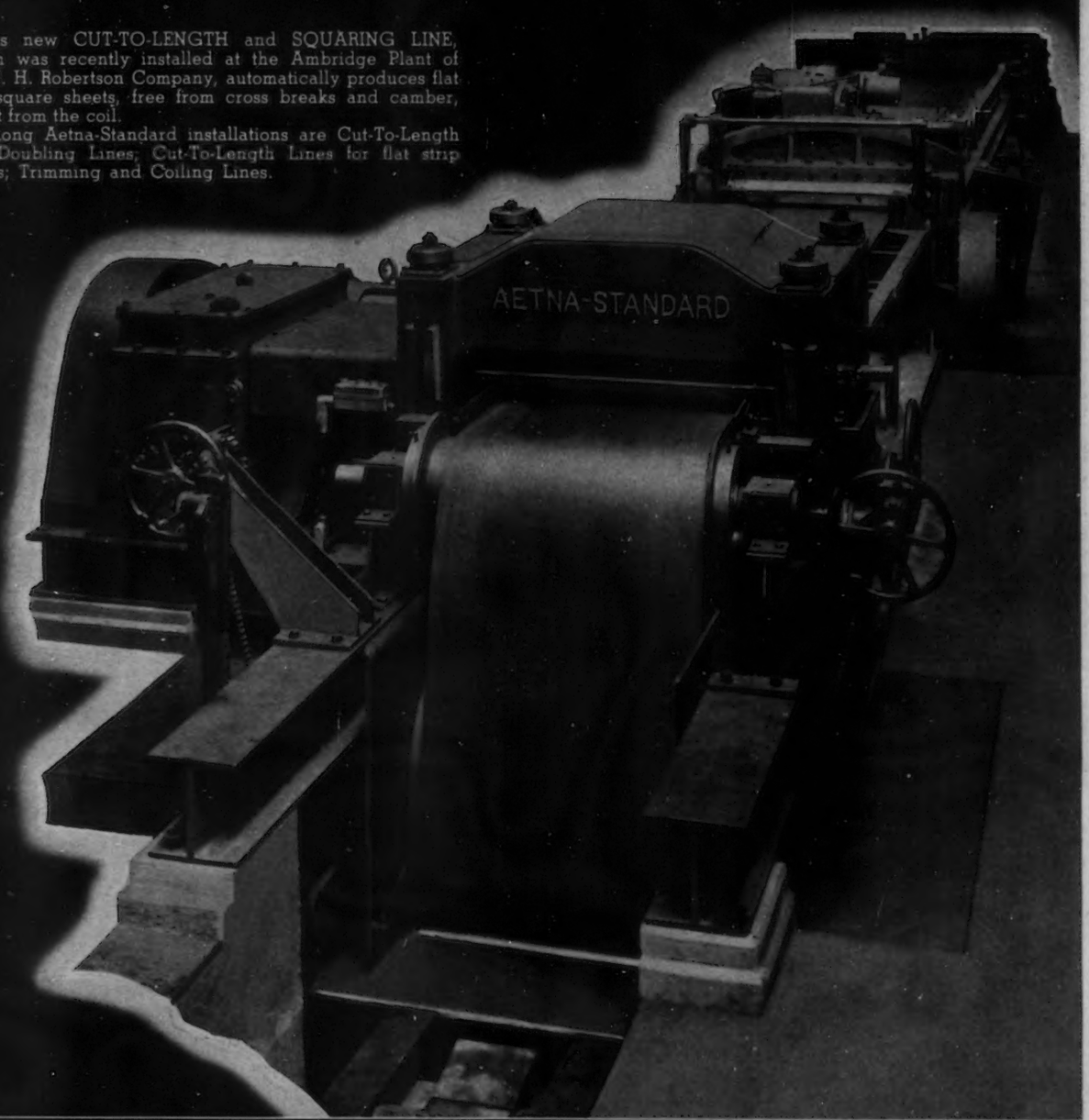
BETHLEHEM STEEL COMPANY

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 140, No. 6.

A NEW AETNA-STANDARD CUT-TO-LENGTH AND SQUARING LINE

This new CUT-TO-LENGTH and SQUARING LINE, which was recently installed at the Ambridge Plant of the H. H. Robertson Company, automatically produces flat and square sheets, free from cross breaks and camber, direct from the coil.

Among Aetna-Standard installations are Cut-To-Length and Doubling Lines; Cut-To-Length Lines for flat strip sheets; Trimming and Coiling Lines.



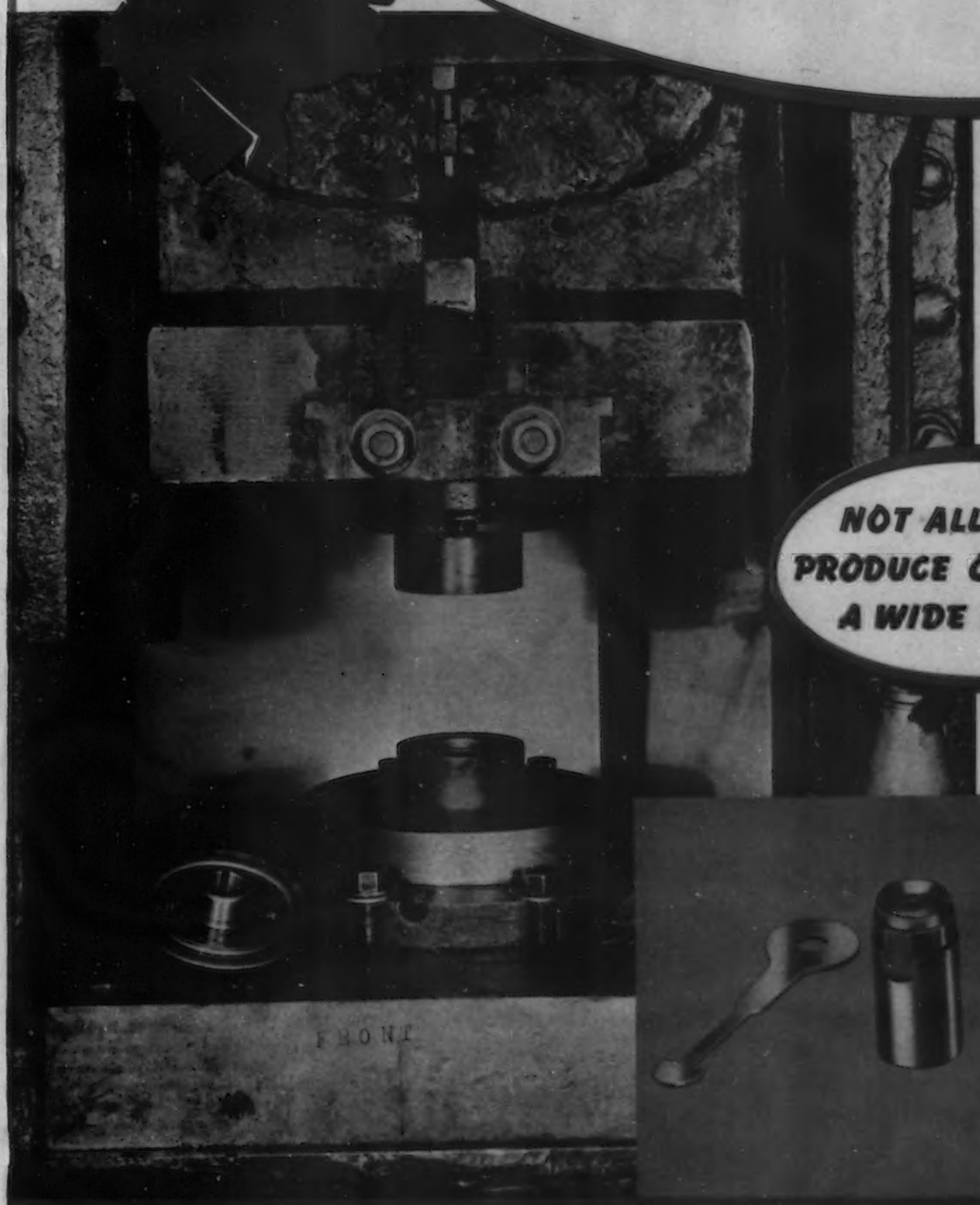
THE AETNA-STANDARD ENGINEERING COMPANY

CONSULTANTS · DESIGNERS · BUILDERS

STEEL AND NONFERROUS INDUSTRIES

YOUNGSTOWN « OHIO » U. S. A.

SMALL DIES OR LARGE
O-HI-O COMES THROUGH



Production of the large pulley does not call for particular skill in selecting the die steel. And yet O-HI-O is a natural for such dies. But on small dies where a light body must stand terrific impact the selection of the die steel is much more important. On this pencil clip die O-HI-O was used because of its known ability to perform even under such circumstances.

Vanadium-Alloys
STEEL COMPANY
LATROBE, PA.

ONE TRIP FREE
out of every 20 . . .
WITH YOLOY HIGH TENSILE
STEEL FOR TANK SHEETS
MARCO
MARTIN OIL CO. L.F.C.L. 12505 GASOLINE KANSAS CITY KANS. ARK. CITY KANS.

Yoloy high tensile steel sheets solved a serious problem for the Columbian Steel Tank Co. when they built the husky semi-trailer shown here. It is not easy to produce a design for 4500 gallon capacity, keep total weight below 34,000 pounds, and still meet I. C. C. specifications.

How well this was done by Columbian and Yoloy is shown by the results. Shell sheets were reduced from 10 to 13 gauge, head sheets from 8 to 11 gauge yet the strength was increased by 10%. This saved 1700 pounds dead weight, equivalent to 225 gallons of gasoline. For a tank capacity of 4500 gallons this is 5%, so that in every 20 trips, one trip is free because of that extra capacity. A fine tribute to the Columbian Steel Tank people and a credit to Yoloy.

Ask our engineers what we can do on your particular problem, and find out for yourself the savings we can make for you.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices: YOUNGSTOWN, OHIO

High Tensile Steel Yoloy is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe and electric weld pipe.

3-3

YOUNGSTOWN

YOLOY TRADE MARK YOUNGSTOWN STEEL

• *Thirty-six-inch Wean continuous strip pickler in plant of large Ohio steel company. Pickler is lined with Goodrich Triflex Rubber Lining. Photo courtesy The Wean Engineering Company, Inc., Warren, Ohio.*

There are 22 Goodrich-lined continuous wide-strip pickle lines operating in America*

IN practically every modern steel plant, Goodrich Tanks are saving money, improving safety of workers, increasing production. The 21st line of these tanks is shown above, lined by Goodrich for a big Ohio steel company—and now operating successfully and already proving its economy.

You who know modern steel production know that rubber-steel-and-brick tanks save money, speed production, end destructive acid leaks, stop all expense and delay of shutdowns for tank repairs. But do you also know that the only rubber-steel-brick tanks with a proven record of success behind them are Goodrich Tanks?

Goodrich engineers developed the modern rubber-steel-brick pickling tank design. It was immediately successful. Since its particular novelty was its rubber lining, rubber was the one thing many steel men remembered most clearly about it—and they came to think that any rubber-lined tank would serve.

But the point to remember is this—materials are only one element in the success of a continuous strip pickler. Design and *experience* are the other neccessary elements. Every installation has many special problems. Goodrich brings to your installation all the experience gained in solving the hundred-and-one problems met in designing and installing 22 successfully operating continuous strip pickle lines in America.

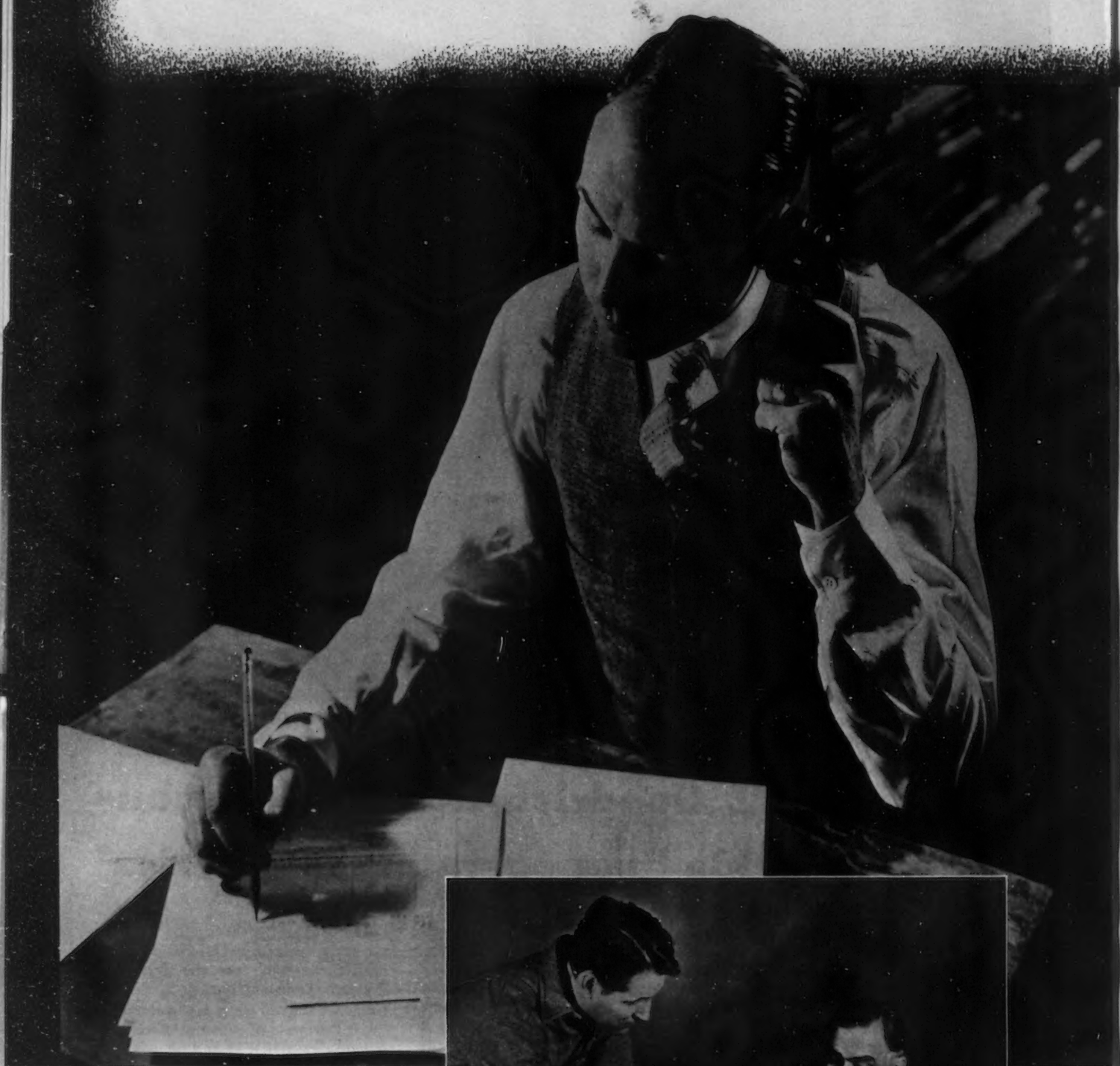
The pickle line is in many ways the bottle-neck of the sheet mill. When so much depends on keeping this bottle-neck open, why take the chance of shutdowns for tank repairs. Specify the tank that has proven it ends all danger and all expense of repair shutdowns—specify GOODRICH and be safe. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio. (In Canada: Canadian Goodrich Company, Ltd., Kitchener, Ontario.)

**As of Aug. 1, 1937. Seven more Goodrich lines under construction.*

Goodrich

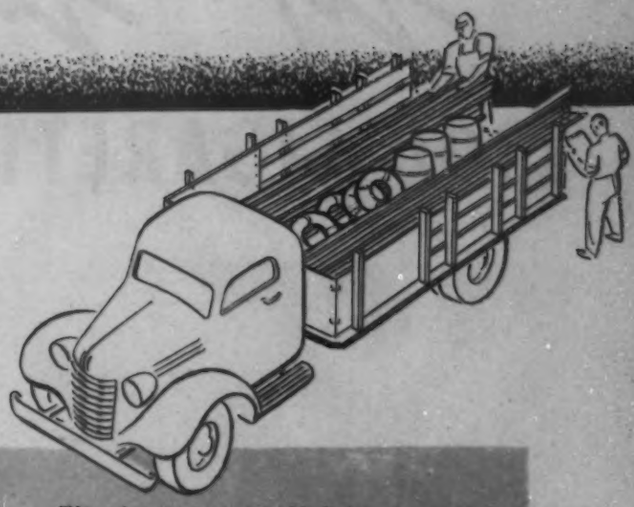
ALL *products problems* IN RUBBER

"Yes we have it. We'll



IN YOUR OWN PLANT, *how often do you face the problem of choosing the steel with characteristics best suited to your product? How can you increase tensile strength . . . reduce dead weight? What steel will last longest under the combined abuses of abrasion and corrosion? When you need help on questions such as these, call your steel jobber. In this way you can profit from his wide knowledge of steel.*

ll rush it right over."



This advertisement is published in the sincere belief that the jobber occupies a sound economic position in industry and that his services merit support, by both consumer and producer.

SWEET words in these trying days when you're in a rush—when you're up against production schedules that can't wait—when you're out of the very steel you need to complete an important job—and with steel mills booked to the limit with urgent orders.

No shop storeroom is big enough today to carry the amazing variety of steels needed hourly by industry. None would be justified economically . . . so great would be the demands for storage space, investment, and warehouse personnel. Your jobber's very investment is made so that you will not have to place these burdens on your plant.

With his warehousing facilities, his ability to meet your daily, even hourly, needs your jobber performs an indispensable service. His stockrooms are yours to draw from. His extensive experience is yours to call upon. He knows steel . . . what is new in special steels and alloys . . . which are best for efficient production and satisfactory performance of your product.

Your steel jobber's service can far surpass the limitations which the size of his warehouse or the number of his personnel would seem to dictate . . . for when he sells U·S·S products he has behind him the complete sales and engineering organizations of the United States Steel Subsidiaries which these products represent.

Purchasing Agent, Manufacturer's Representative, Warehouser — your steel jobber is all three to you. He is as near as your telephone. Get to know him better. Use him more. Draw upon his wide knowledge of steels. He has no other aim than to serve you well. He asks no more than the opportunity.

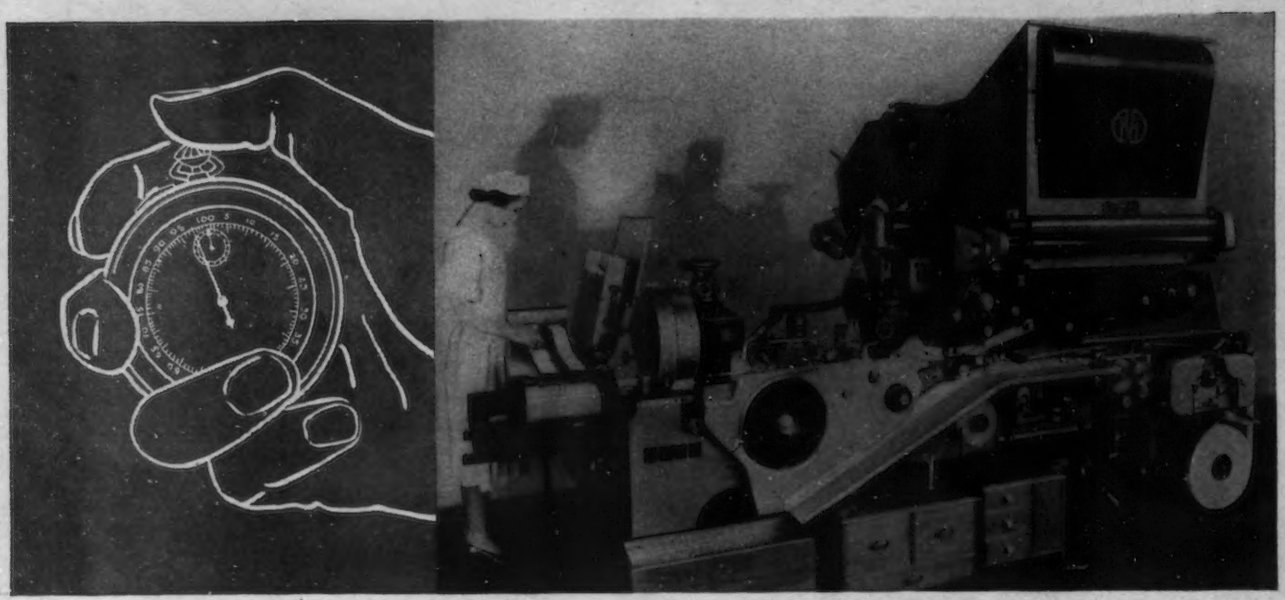
AMERICAN STEEL & WIRE COMPANY
CARNEGIE-ILLINOIS STEEL CORPORATION
COLUMBIA STEEL COMPANY — CYCLONE FENCE COMPANY
NATIONAL TUBE COMPANY
TENNESSEE COAL, IRON & RAILROAD COMPANY

USS

UNITED STATES STEEL

zip zip zip

1300 CIGARETTES PER MINUTE...



Vanadium Steels contribute to the efficiency and dependability of cigarette making machines built by American Machine and Foundry Company, Brooklyn, N. Y.

and a Vanadium Steel Shaft Turns at 7500 R.P.M.

A splendid example of automatic machinery is the cigarette making machine built by American Machine & Foundry Company, Brooklyn, N. Y.

The American machine illustrated is capable of producing 900 to 1,300 cigarettes per minute. It has a number of moving parts which operate at very high speed. The Vanadium Steel shaft on the knife spindle, for example, turns at 7,500 revolutions per minute. Several Vanadium Steel shafts in the tobacco compressing mechanism operate at 3,600 r.p.m. Another severely stressed Vanadium Steel part is the long shaft in the tobacco feed, an application in which ordinary steel proved inadequate.

If you make or use automatic machinery of any kind it will pay you to investigate the advantages of Vanadium Steels. In shafts, gears, spindles and other applications... in small precision parts or in large forgings and castings... the toughness and stamina of Vanadium Steels insure dependable, low-cost machine operation. Metallurgists of the Vanadium Corporation of America will be glad to counsel with you in the selection of steel for vital parts of automatic machinery.

•

VANADIUM CORPORATION OF AMERICA
420 LEXINGTON AVENUE, NEW YORK, N. Y.

Plants at Bridgeville, Pa., and Niagara Falls, N. Y.
Research and Development Laboratories at Bridgeville, Pa.

Vanadium Steels

VANADIUM

FERRO ALLOYS
of vanadium, silicon, chromium, and titanium, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

FOR STRENGTH · TOUGHNESS · DURABILITY

LEAF SPRING LIFE BEGINS RIGHT HERE

● That easy floating ride given you by the modern motor car is born with the leaf springs . . . and the cushioning effect of the springs, their ability to flex and absorb the shock millions of times without breaking . . . starts with their modern heat treatment.

There are no other parts of the car subjected to higher stresses than the springs. The ability of the springs to "take it" is a high tribute to modern engineering. The heat treatment of such highly stressed parts must of necessity be very precise. Absolutely no decarburization with resultant "soft spots" is permissible. Even a slight decarburization of a few thousandths of an inch on the surface will cause the springs to take a gradual and continuous set in service resulting in early failure. Likewise detrimental scale cannot be tolerated.

Making possible such precise work at the Detroit Steel Products Company are five SC clean hardening furnaces utilizing a controlled atmosphere of DX gas when required. Heating is accomplished by means of SC gas-fired *radiant tube heating elements.* Supplemented by three SC air-draw furnaces, specifications as close as 444 to 461 Brinell are being met without serious difficulty. No matter what your heat treating problem is call in an SC engineer

SURFACE COMBUSTION CORPORATION, Toledo, Ohio

SURFACE COMBUSTION

Builders of... ONE WAY FIRED SOAKING PITS, BILLET HEATERS, PACK OR PAIR, ANNEALING, CONTROLLED ATMOSPHERE FURNACES, NORMALIZERS

THE WONDERFUL "ONE-HOSS SHAY"

Have you heard of the wonderful one-hoss shay,
That was built in such a logical way
It ran a hundred years to a day.

Seventeen hundred and fifty-five.
Georgius Secundus was then alive,—
That was the year when Lisbon-town
Saw the earth open and gulp her down,
It was on that terrible Earthquake-day
That the Deacon finished the one-hoss shay.

Now in building of chaises, I tell you what,
There is always *somewhere* a weakest spot,—
In hub, tire, felloe, in spring or thill,
In panel, or crossbar, or floor, or sill,
In screw, bolt, thoroughbrace,—lurking still,
Find it somewhere you must and will.

But the Deacon swore (as Deacons do, with an "I dew vum," or an "I tell yeou,")
He would build one shay to beat the taown
It should be so built that it *couldn'* break daown:
—"Fur," said the Deacon, "'t 's mighty plain
Thut the weakes' place mus' stan' the strain;
'n' the way t' fix it, uz I maintain,
Is only jest
T' make that place uz strong uz the rest."

So the Deacon inquired of the village folk
Where he could find the strongest oak,
That couldn't be split nor bent nor broke,—
That was for spokes and floor and sills;
He sent for lancewood to make the thills;
The crossbars were ash, from the straightest trees;
The panels of white-wood, that cuts like cheese,
But lasts like iron for things like these;
The hubs of logs from the "Settler's ellum,"—
Last of its timber,—they couldn't sell 'em,
Step and prop-iron, bolt and screw,
Steel of the finest, bright and blue;
Thoroughbrace bison-skin, thick and wide;
Boot, top, dasher, from tough old hide
Found in the pit when the tanner died.
That was the way he "put her through."—
"There:" said the Deacon, "naow she'll dew."
Do! I tell you, I rather guess
She was a wonder, and nothing less!
Colts grew horses, beards turned gray,
Deacon and deaconess dropped away,
But there stood the stout old one-hoss shay
As fresh as on Lisbon-earthquake-day!

EIGHTEEN HUNDRED;—it came and found
The Deacon's masterpiece strong and sound.
Eighteen hundred increased by ten;—
"Hahnaum kerridge" they called it then.
Thirty and forty at last arrive,
And then come fifty, and FIFTY-FIVE.

FIRST OF NOVEMBER,—the Earthquake-day.—
There are traces of age in the one-hoss shay,
A general flavor of mild decay,
But nothing local, as one may say.
There couldn't be,—for the Deacon's art
Had made it so like in every part
That there wasn't a chance for one to start.

First of November, 'Fifty-five!
This morning the parson takes a drive.
Now, small boys, get out of the way!
Here comes the wonderful one-hoss shay.

The parson was working his Sunday's text,—
Had got to *fifthly*, and stopped perplexed
At what the—Moses—was coming next.
—First a shiver, and then a thrill,
Then something decidedly like a spill,—
And the parson was sitting upon a rock!
At half-past nine by the meet'n'-house clock;—
Just the hour of the Earthquake shock!
—What do you think the parson found,
When he got up and stared around?
The poor old chaise in a heap or mound,
As if it had been to the mill and ground!
You see, of course, if you're not a dunce,
How it went to pieces all at once,—
All at once, and nothing first,—
Just as bubbles do when they burst.

End of the wonderful one-hoss shay.
Logic is logic. That's all I say.

OLIVER WENDELL HOLMES

Condensed from Oliver Wendell Holmes for those who haven't read his delightful poem since grammar-school days—and because it illustrates so aptly the reason for the increasing use of U·S·S Carilloy Alloy Steels.

USS

UNITED

"Fur," *said the Deacon,*
"'t's mighty plain

thut the weakes' place mus' stan' the strain...'

That strengthening of vital parts is the job U·S·S Carilloy Alloy Steels are designed to do

HE was born 200 years too soon—that delightful deacon who built the famous one-hoss shay—for he was an engineer at heart. With his penchant for making each part "uz strong uz the rest" he was doing just the job that automotive engineers are accomplishing today with such outstanding success.

And the parallel does not stop there.

When the deacon "inquired of the village folk" he was going to headquarters for help and cooperation in finding better and stronger materials, just as automotive engineers are when they call in alloy specialists from the metallurgical laboratories of Carnegie-Illinois.

When he selected "crossbars of ash from the straightest trees" and "steel of the finest, bright and blue" he was exercising the same painstaking selection of materials as automotive engineers when they specify carefully developed grades of U·S·S Carilloy Alloy Steels to strengthen vital parts.

Their new 1938 models will be no less outstanding than the deacon's masterpiece, because today's conception of fine performance includes both long life and that smooth, trouble-free joy of driving which makes a hesitant prospect decide to trade.

We salute these ingenious automotive engineers — the modern prototype of Holmes' ingenious Deacon.

We take pride in supplying them with the finest alloy steels it is now possible to make, for strengthening the vital parts in their designs. We take pleasure in working with them, to develop even finer alloy steels to achieve new heights in smooth performance.

U·S·S CARILLOY ALLOY STEELS

CARNEGIE-ILLINOIS STEEL CORPORATION
Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

S T A T E S S T E E L

In all types of Industry . . . . . .

meeting all kinds of conditions . . . .

YOU WILL FIND

MIDVALE

FORGINGS

For heavy duty, for heat, for whatever the requirement, the probability is that Midvale has already had to duplicate your problem for someone else. Starting with clean, sound metal—testing at every stage, from the pouring of the ingot to the finished forging—every safeguard is taken to insure that the time you spend later in machining, finishing and installing is not wasted. Two-thirds of a century's experience in steel and its alloys goes into even the simplest forging made at Midvale. The result is a safety factor for you that saves both trouble and needless expense.

THE MIDVALE COMPANY · NICETOWN · PHILADELPHIA

OFFICES: *New York* • *Chicago* • *Pittsburgh*
Washington • *Cleveland* • *San Francisco*

QUALITY

...heared Steel Plate by WORTH

Quality—consistent, because every step of production is a ***controlled***, precision process.

Quality—uniform, because alloy, finish, size, gauge, etc., is ***controlled***.

Quality—faultless, because every steel plate is rigidly inspected before it can be released; not even minor surface flaws can get by.

Quality—backed by the integrity of an established, experienced maker.

And—***SERVICE*** planned for your needs—given cheerfully, courteously and promptly to your best interests.

May we serve you?

REPRESENTATIVES

New York, N. Y.
Wm. C. Dickey

Pittsburgh, Pa.
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The Corbett Corp.

Seattle, Wash.
W. C. Scott, Jr.

Los Angeles, Calif.
Ducommun Metals & Supply Co.

Cleveland, Ohio
E. F. Bond

Detroit, Mich.
H. L. Sevin

Montreal & Toronto, Canada
Drummond, McCall & Co., Ltd

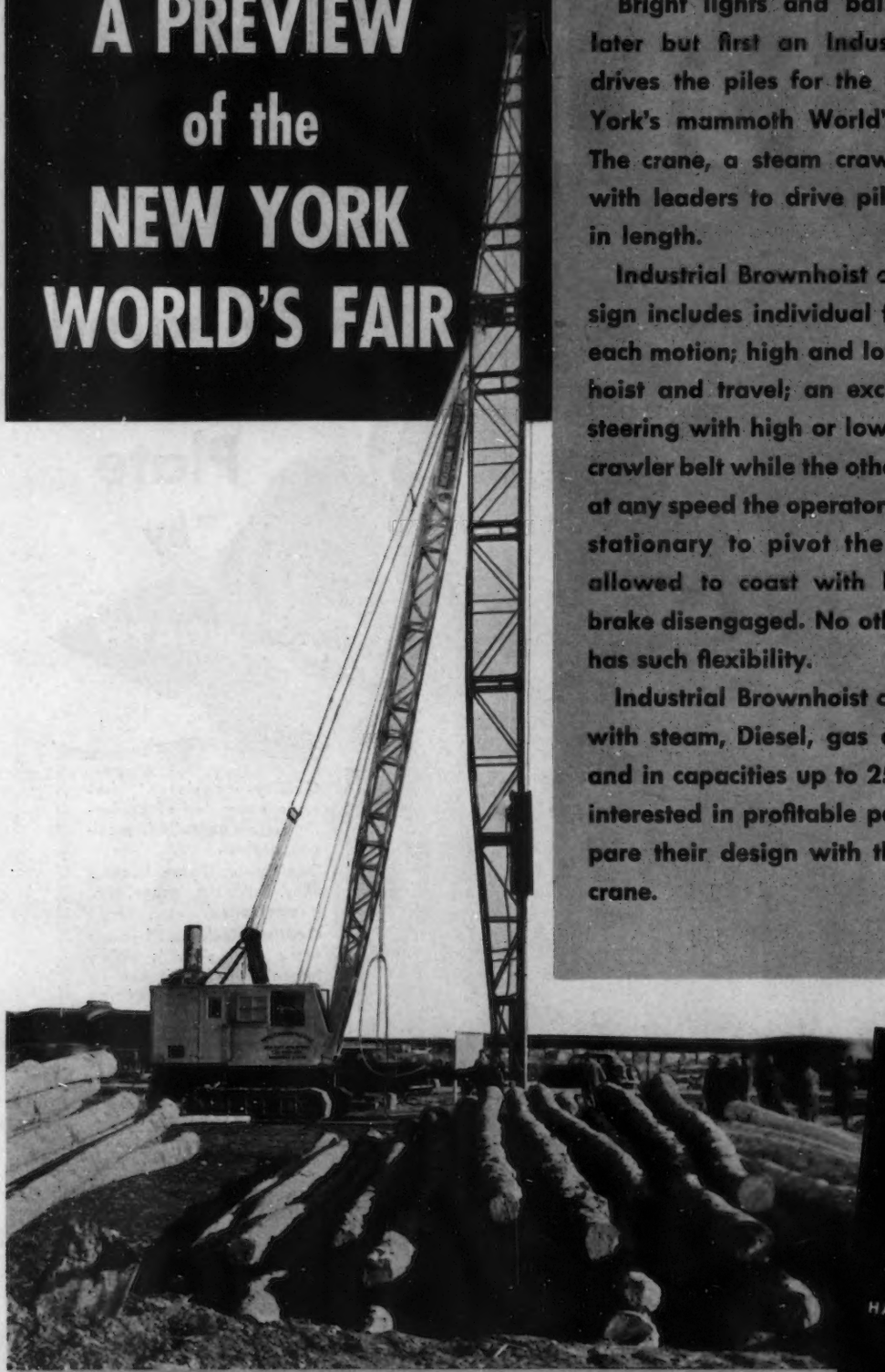
WORTH STEEL COMPANY · CLAYMONT · DEL.

A PREVIEW of the NEW YORK WORLD'S FAIR

Bright lights and ballyhoo will come later but first an Industrial Brownhoist drives the piles for the footings of New York's mammoth World's Fair spectacle. The crane, a steam crawler, is equipped with leaders to drive piles up to 95 feet in length.

Industrial Brownhoist crawler crane design includes individual friction clutch for each motion; high and low speeds on *both* hoist and travel; an exclusive three-way steering with high or low speeds on either crawler belt while the other is, (1) propelled at any speed the operator requires, (2) held stationary to pivot the machine or (3) allowed to coast with both clutch and brake disengaged. No other crawler crane has such flexibility.

Industrial Brownhoist crawlers are built with steam, Diesel, gas or electric power and in capacities up to 25 tons. If you are interested in profitable performance, compare their design with that of any other crane.

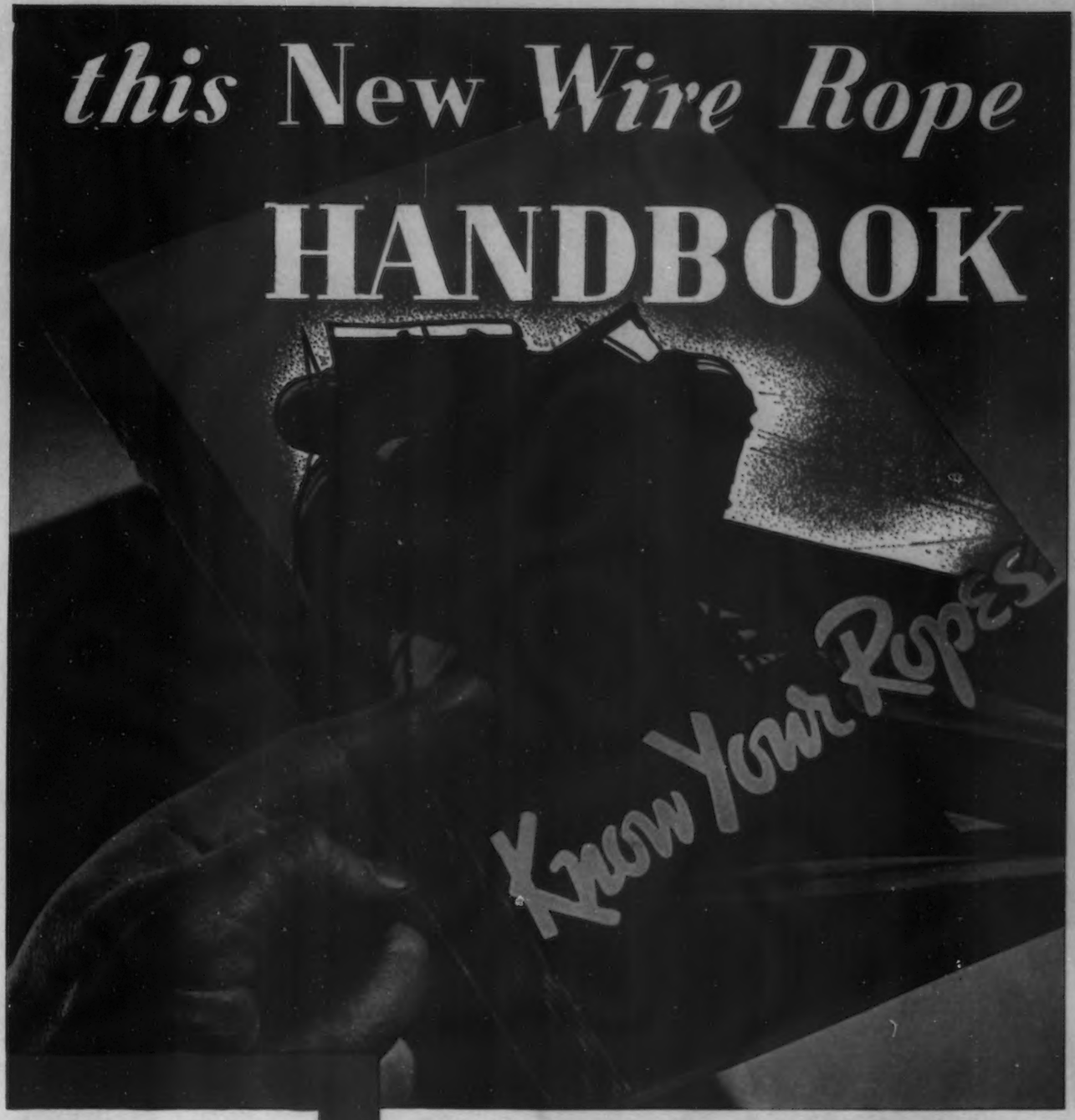


LOCOMOTIVE CRANES
6 to 200 Tons Capacity
CRAWLER CRANES
GASOLINE CRANES
DIESEL CRANES
ERECTION CRANES
BRIDGE CRANES
HAND TRAVELING CRANES
BUCKETS
PILE DRIVERS
PILE HAMMERS
DOCK MACHINERY
CAR DUMPERS

Industrial Brownhoist Corp., Bay City, Michigan
District Offices: New York, Philadelphia, Cleveland, Chicago

INDUSTRIAL BROWNHOIST

this New Wire Rope HANDBOOK



80 PAGES

of valuable, easy reading information on how to make wire rope yield longer service through proper selection and care when in use. Not one line of advertising. If you have not already made your request, fill in the coupon below and receive a complimentary copy. IT WILL SAVE YOU MONEY.

WIRE ROPE
by Wickwire Spencer

WICKWIRE SPENCER STEEL COMPANY, 41 East 42nd St., New York City

Please send me a complimentary copy of your new wire rope handbook "Know Your Ropes".

Name_____

Firm_____

Address_____

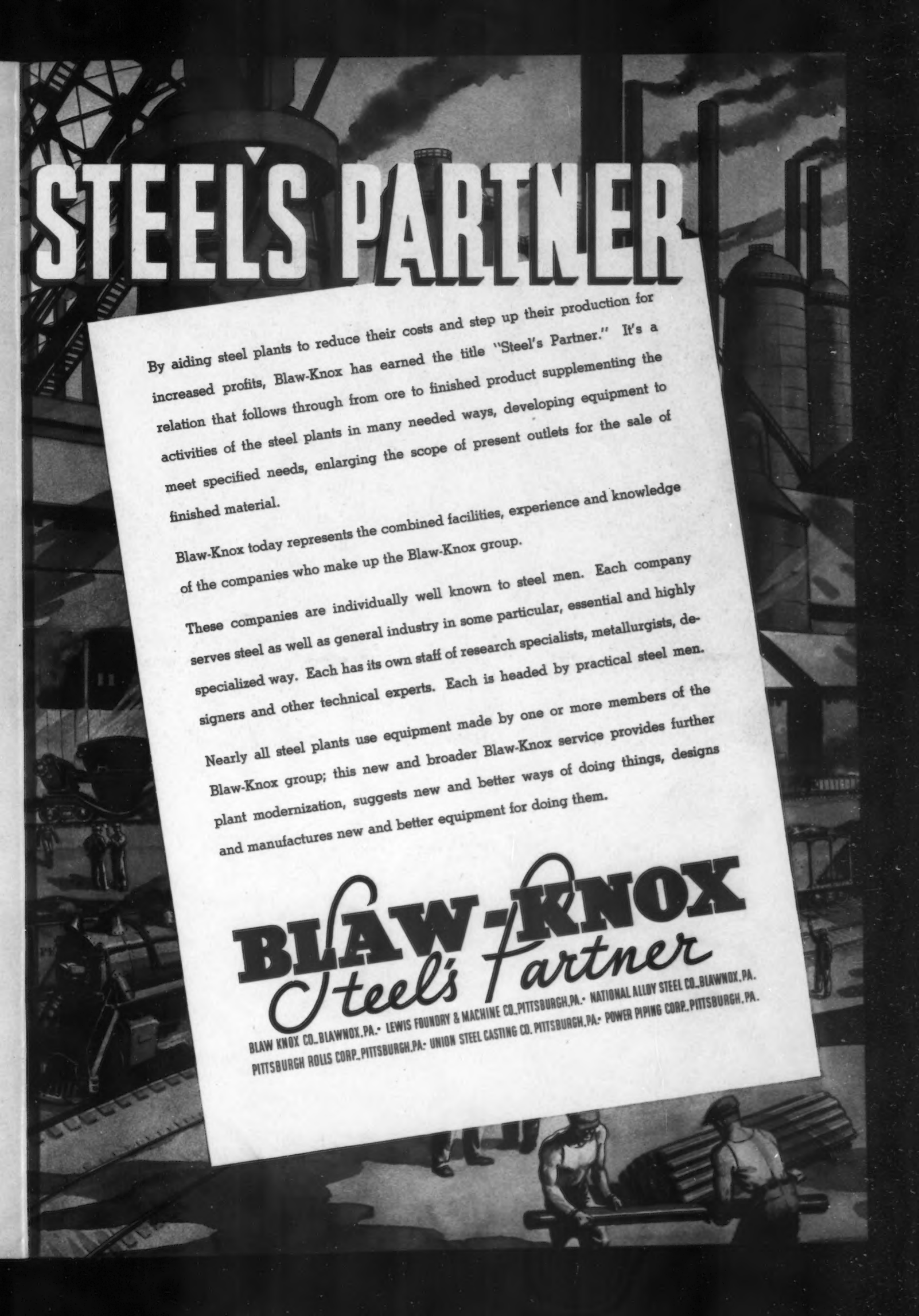
City_____ State_____ IA

Whitey Sez:

"Vacation with pay for the boss? Sure it's possible! Stock up with MAURATH *Electrodes before you leave . . . You're bound to find well earned dividends upon your return."*

MAURATH, INC., CLEVELAND

BUILDER OF BETTER WELDING ELECTRODES IN ALL ANALYSES



STEEL'S PARTNER

By aiding steel plants to reduce their costs and step up their production for increased profits, Blaw-Knox has earned the title "Steel's Partner." It's a relation that follows through from ore to finished product supplementing the activities of the steel plants in many needed ways, developing equipment to meet specified needs, enlarging the scope of present outlets for the sale of finished material.

Blaw-Knox today represents the combined facilities, experience and knowledge of the companies who make up the Blaw-Knox group.

These companies are individually well known to steel men. Each company serves steel as well as general industry in some particular, essential and highly specialized way. Each has its own staff of research specialists, metallurgists, designers and other technical experts. Each is headed by practical steel men.

Nearly all steel plants use equipment made by one or more members of the Blaw-Knox group; this new and broader Blaw-Knox service provides further plant modernization, suggests new and better ways of doing things, designs and manufactures new and better equipment for doing them.

BLAW-KNOX
Steel's Partner

BLAW KNOX CO., BLAWNOX, PA. • LEWIS FOUNDRY & MACHINE CO., PITTSBURGH, PA. • NATIONAL ALLOY STEEL CO., BLAWNOX, PA.
PITTSBURGH ROLLS CORP., PITTSBURGH, PA. • UNION STEEL CASTING CO., PITTSBURGH, PA. • POWER PIPING CORP., PITTSBURGH, PA.

Flash of the many sides symbolized b

BLAW-KNOX COMPANY

Blaw-Knox manufactures open hearth equipment, clamshell buckets, steel grating, tin mill boxes, steel buildings, etc.

NATIONAL ALLOY STEEL COMPANY

Thousands of castings made by this company are in service under conditions of extreme severity, high temperatures, and corrosive atmospheres.

LEWIS FOUNDRY & MACHINE COMPANY

Since 1856 Lewis rolls and rolling mill machinery have been used by steel plants.

POWER PIPING CORPORATION

Complete service in designing, fabricating, and erecting pressure piping systems. Designs, fabricates, installs automatic sprinkler systems.

dservice to Steel
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PITTSBURGH ROLLS CORPORATION

Exclusively a manufacturer of rolls for 61 years, this company has materially assisted the steel industry in increasing production and quality and preventing time-loss.

UNION STEEL CASTING COMPANY

Univan castings have long been noted for strength and toughness. This company's products have been making good and saving money under excessively hard conditions—as in charging boxes, spindles, coupling boxes, etc.

PARTIAL LIST OF PRODUCTS

BLAW-KNOX COMPANY

Water cooled doors and frames, valves, ports, slag line coolers, bulkhead coolers, burner coolers, mantel coolers, buckstays, preheaters, dolomite machines, sloping backwalls, Venturi furnaces, single motor door hoists, annealing boxes, covers and pots, galvanizing kettles, etc., clamshell buckets, steel grating and treads, standard buildings, steam purifiers, gas cleaners, etc.

LEWIS FOUNDRY & MACHINE COMPANY

Mill drives, three high mills, continuous bar and billet mills, cold mills for sheet and strip, shape straightener machines, motor operated screwdown for mills, gear sets, plate levelers, rail breakers, rail re-rolling mills, universal mill spindles, shears of all varieties, testing machines.

Chilled iron and iron alloy rolls for iron, steel, brass, copper, aluminum, zinc and nickel, hot sheets, cold sheets, tin plate and strip, merchant bars and rods, special machinery for the rolling mill industry.

NATIONAL ALLOY STEEL COMPANY

Special alloy castings for service under severe conditions, creating savings in operations especially with regard to problems involving high temperature, corrosion and abrasion.

PITTSBURGH ROLLS CORPORATION

PHOENIX ROLLS: Phoenix steel for unusual strength, Phoenix "A" (steel alloy) for strength and wear; Phoenix metal—Phoenix "K" for strength, wear, and finish, Phoenixloy (uniformly hard) for flat rolling where high finish of extremely thin gage of material is required to be free from all marks and defects; also tube mill rolls of quality material best suited to the kind of service required. Phoenix Chill — Phoenix nickel chill for all flat rolling requiring finish.

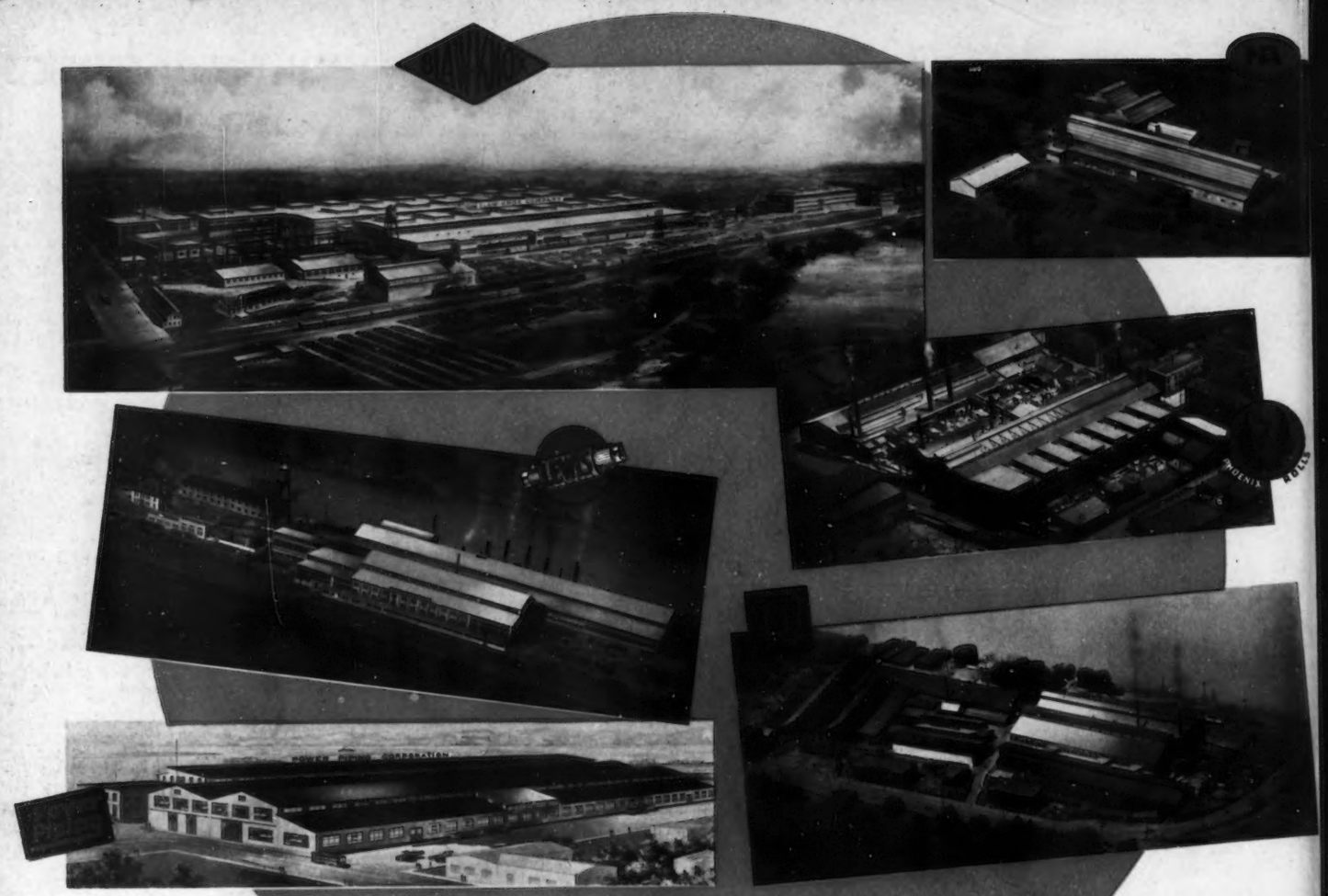
UNION STEEL CASTING COMPANY

Spindles, coupling boxes and other steel mill castings of UNIVAN "C" to insure great strength and exceptional wearing qualities. Charging boxes made of tough UNIVAN alloy have longer life because of unusually high impact value.

POWER PIPING CORPORATION

Pipe systems prefabricated and erected. Prefabrication guarantees greater dimensional accuracies of sub-assemblies, few field joints to be tested, freedom from shutdown due to failure; also automatic sprinkler systems guaranteed to meet all insurance requirements.

BLAW-KNOX
Steel's Partner



"STEEL MINDED"

The companies that are united under the term BLAW-KNOX vary in their functions. Yet many of their highly specialized activities center in STEEL. They think steel, talk steel, serve steel.

A glance at the names of the companies, a moment's considering of their standing, experience and facilities . . . and you can immediately sense how valuable an ally Blaw-Knox can be to you—not only in furnishing equipment, but in thinking and planning for the future—a future in which the *best way* to increase profits is to utilize the best engineering and machinery obtainable.

Blaw-Knox engineers are available for conference at any time. No obligation involved, of course.

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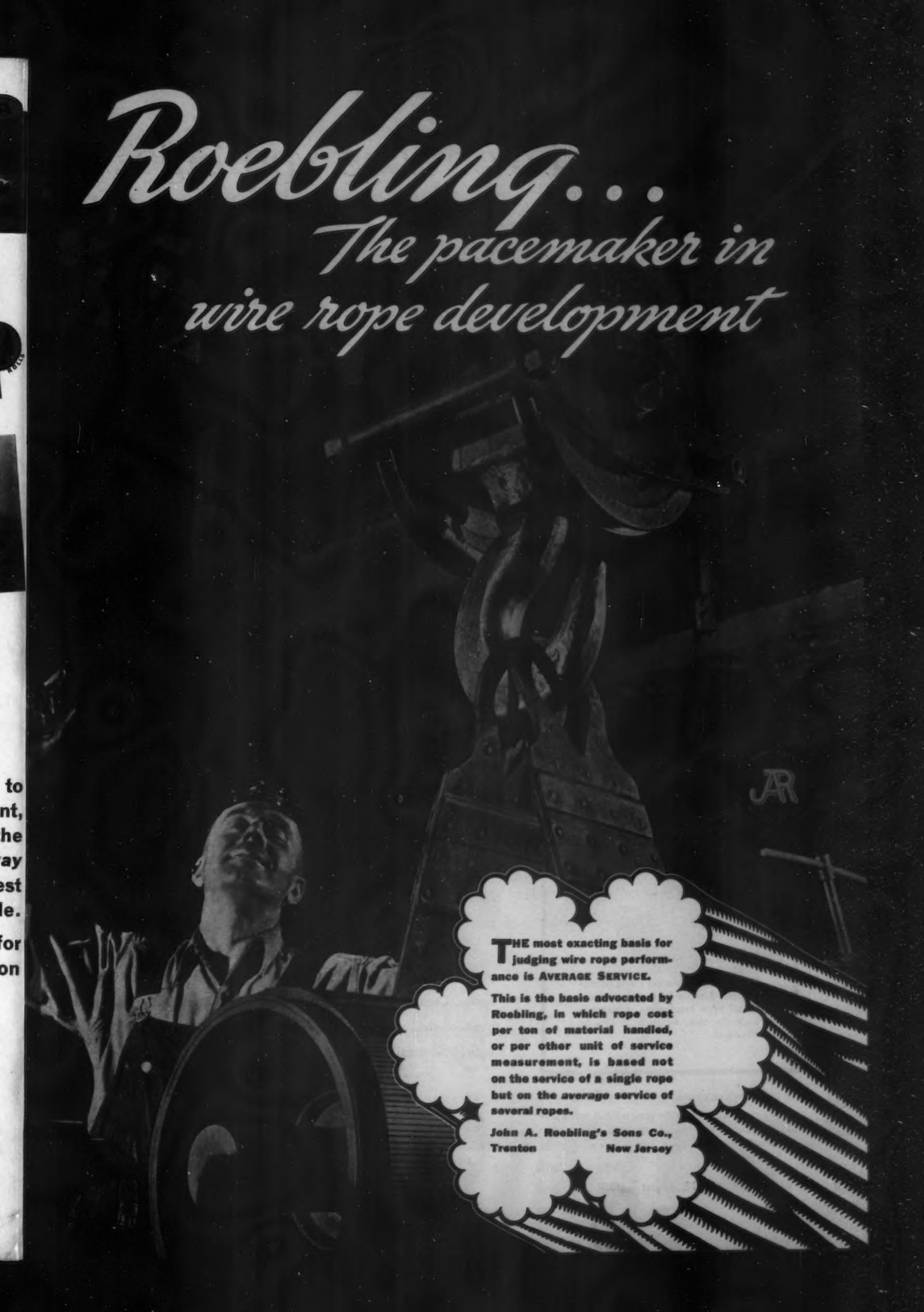
Roebling...

The pacemaker in wire rope development

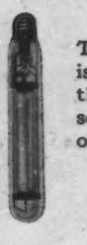


THE most exacting basis for judging wire rope performance is AVERAGE SERVICE.

This is the basis advocated by Roebling, in which rope cost per ton of material handled, or per other unit of service measurement, is based not on the service of a single rope but on the *average* service of several ropes.

John A. Roebling's Sons Co., Trenton New Jersey

Light that reduces spoilage...



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By combining Mercury and Incandescent Lamps in many conventional type luminaires, a psychologically cool, white light can be obtained.

The high levels of illumination that are being obtained with General Electric Mercury Lamps make it easier for workers to see without effort. Wasted time is minimized, for eye-strain and its resultant fatigue are greatly reduced. Production is speeded up and spoilage is held down materially. Economy, too, is promoted—for General Electric Mercury Lamps provide more light per watt than other comparable light sources.

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Order your auxiliary devices which were designed especially for this lamp from the General Electric Vapor Lamp Co.

GENERAL ELECTRIC

General Electric Vapor Lamp Co. 795H Incandescent Lamp Department
833 Adams Street, Hoboken, N. J. Dept. 165, Nela Park, Cleveland, Ohio

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As Inland Metallurgists Use the Term

The term "workability" as applied by Inland metallurgists has a broad meaning. It includes all of those physical and metallurgical qualities of a steel sheet that can affect the customer's manufacturing cost. Speed of forming operation, amount of spoilage, wear of dies, suitable finish . . . and other such cost factors are included.

Their long experience with the *hidden costs* of working with steel often results in important savings for Inland customers. Their job is to improve the "workability" of the steel you get from Inland . . . to link every step in the making of your steel more closely to your individual requirements. And their personal attention to your operations and finished products involves no obligation.

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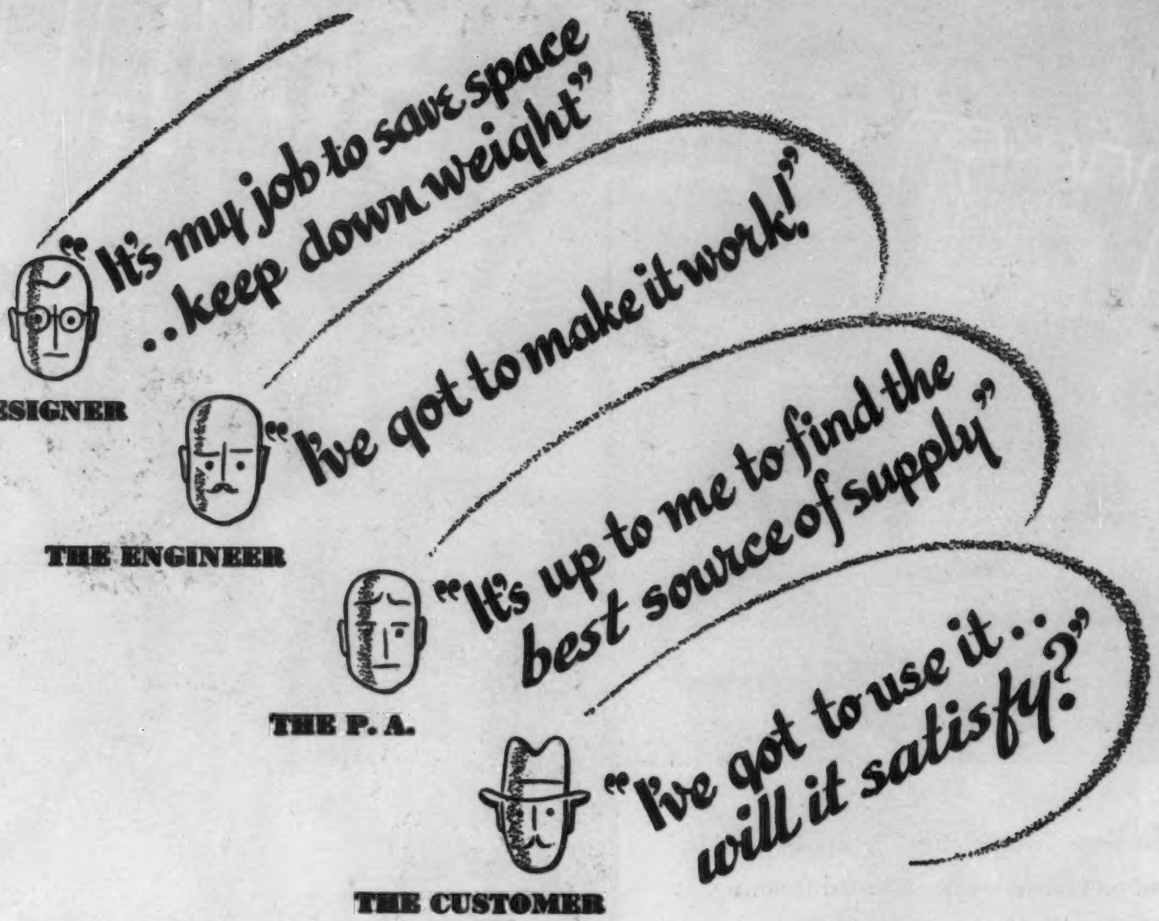
"It's my job to save space ..keep down weight"
THE DESIGNER
"I've got to make it work!"
THE ENGINEER
"It's up to me to find the best source of supply"
THE P. A.
"I've got to use it... will it satisfy?"
THE CUSTOMER

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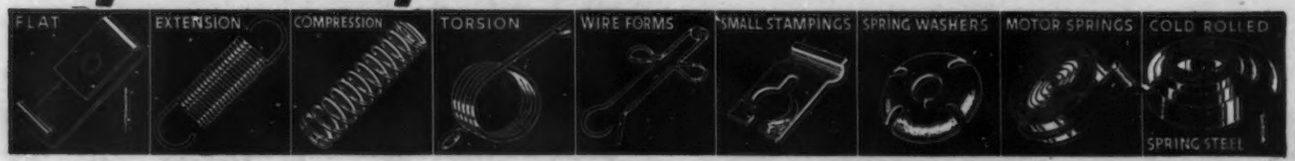

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THE IRON AGE

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RYERSON STEEL-SERVICE

THE IRON AGE

AUGUST 5, 1937

ESTABLISHED 1855 Vol. 140, No. 6

Consider the Zipper

HOW would the proposed National Board for the Forecasting and Control of Inventions, proposed by the President's Committee on National Resources, handle the case of the zipper, assuming that it had not as yet been invented?

The zipper, as you know, is that clever little device which takes the place of buttons and other fasteners. The zipper really has very large social implications, reverberations and repercussions; larger, perhaps than have steep angle airplanes or house trailers. Thus the zipper would probably come under the jurisdiction of such a board.

Let us sit into an imaginary board meeting, to consider the as yet (assumedly) unthought of zipper.

Chairman Whoozis: "Gentlemen, we are here to discuss the social implications involved in doing away with buttons. Some guy may think of this some day and we should be prepared to say 'yes' or 'no'."

Prof. Whyzis: "Excluding the nudists and the infants who are still in the safety-pin age, we have 115,000,000 people in this country using buttons. At a conservative estimate of 10 buttons per person, buttoned and unbuttoned once each day and an average time required of ¼ sec. for buttoning or unbuttoning each button, I arrive at the astonishing total of 57,500,000 man hours per year for buttoning and unbuttoning our buttons. Since one of the main objectives of the New Deal is to increase leisure among our people, I am for any invention which will save any considerable part of this tremendous amount of time. It looks to me like an open and shut proposition."

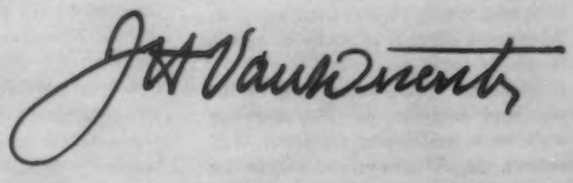
Prof. Howzis: "Considering this subject fundamentally from its impingement upon the sociological pattern as related to technological involuntary displacement, I desire to enunciate and emphasize the indisputable fact that 12,000 of our citizens are now gainfully employed in the manufacture of buttons; 14,000 individuals are employed in the correlated and adjunctive occupation of constructing button holes; 6,500 members of *genus homo Americanus* are occupied in attaching buttons to garments by means of thread or other fastening devices and 4,800 additional persons gain a livelihood through associated activities such as the manufacture, collection or transportation of the miscellaneous and diversified materials from which buttons are customarily fabricated. If therefore buttons were to be abolished, the resultant would eventuate in a gross maximum technological displacement aggregating 65,860,000 man hours per year premised upon the hypothesis of a mean, average, secular, interseasonal, integrated, progressive, occupational working week trend stabilized at 35 hours. Since one of the main objectives of the New Deal is to restrain the increase of unemployment, I am against any possibility such as would be concomitant with the invention under consideration. To me, it appears to be an open and shut proposition."

Mr. Lewzis: "Representing as I do the great masses of American organized labor whose throats are even now exposed to the cruel fangs of heartless monopolistic employers, I would be remiss to my duty did I not tell you that votes is votes. Since one of the main objectives of the New Deal is to get and keep the votes, I am against any possibility such as this, which is likely to alienate them. It looks to me, like an open and shut proposition and I therefore move, Mr. Chairman, that the future invention of any such device shall be prohibited by law."

• • •

How do *you* think that the board would act in this case?*

Ten dollars each will be paid for answers from our readers which are accepted for publication.



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"IN days of old, when knights were bold," the craftsmen who made the armor for these warriors laid the foundation for the pressed metal industry. Mechanization, of course has played its part in the evolution from past to present, but the spirit of craftsmanship survives and is conscientiously cultivated.

o o o

The Technique of Design for

THE experienced press tool designer with ample background in this specialty, determinedly overlooks the academic principles of "machine design" applied to cast iron and wrought iron construction. After conceding a gesture of credit to those early pioneers, who were limited by crude materials, methods and customs, he *starts fresh* with new materials, facilities, and standards. His environment is the modern strip-sheet rolling mill and a fleet of double action drawing presses. He goes back to the eternal examples set by Nature, and evolves functional plastic shapes for modern mechanisms, speeds and demands. He takes full advantage of the abundance of new alloyed metals and synthetic compounds now available for specific purposes, and utilizes marvelous equipment for modern mass production. No longer is there necessity or excuse for forcing inappropriate applications.

His primitive engineering ancestor who designed the first wheel, utilizing the trunk of a tree as a roller, conferred a great blessing on mankind. Successors, for the purpose of eliminating unnecessary weight, carved out or built up their wheels from the only materials then available, with hubs, spokes, and rims assembled at *joints*. This construction introduced maintenance

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THUS as the Worcester Pressed Steel Co., Worcester, Mass., the John Woodman Higgens Armory, with its carefully selected examples of craftsmanship of the past, serves as an inspiration in design, in quality and in beauty of product for the modern artificers in sheet metal.

o o o

Pressed Steel Construction

By JOHN W. HIGGINS
President, Worcester Pressed Steel Co.

o o o

difficulties because joints like hinges work loose; that is their destiny.

Our grandfathers, recognizing that stresses in a lever or load-carrying beam concentrate on the top and bottom surfaces, eliminated the intervening useless material, and left these two thin surfaces connected by a thin web. Good—this gave us our rolled iron "eye-beam" and "channel"—the basis of all modern steel bridge and building construction. They figured these stresses by trigonometric formulae with admirable accuracy, but they had to multiply their results by 10 or 15 for a practical "factor of safety." Our generation developed the X-Ray "stressometer" which substitutes for their guess a photograph of absolute stresses. Now we distribute our precious superior material only where it is needed to do the work. We do not broadcast blindly and waste half of it. From rolled sheet steel we form our disk wheel and pulley—the lightest, strongest construction—patterned after Nature's *eggshell*. The strain is *distributed* over surfaces rather than *concentrated* in

o o o

MOST of the effort of ancient metal craftsmen was devoted, apparently, to making the utensils of war. Today, in our metal-working industry, most of our efforts are applied to making products for peace and prosperity. But imagine the astonishment of the metal-worker of centuries ago if he could see the giant presses of today, which do, in seconds, what required him weeks.

o o o

spots. The modern dirigible frame simulates Nature's construction of the leaf of a tree, as closely as our static materials allow. Some day our successors may utilize living tissues.

Evolution is a natural growth, but in this age of science applied to mass production, experienced pressed steel designers and craftsmen tackle every new job *at the top*. They do not have to begin again with the first crude types, repeat the primitives, and trace the intermediate steps with modern alloy steels. Their aim is to *distribute* rather than *concentrate* stresses—to utilize uniformly every ounce of suitable material, a technique immortalized two generations ago by the poet, Oliver Wendell Holmes, in his "Wonderful One-Hoss Shay."

"Have you heard of the wonderful one-hoss shay,
That was built in such a logical way?

* * *

"Now in building of chaises, I tell you what
There is always *somewhere a* weakest spot,—
In hub, tire, felloe, in spring or thill,
In panel, or crossbar, or floor, or sill,
In screw, bolt, thoroughbrace—lurking still
Find it somewhere you must and will.—
Above or below, or within or without,—
And that's the reason, beyond a doubt,
That a chaise *breaks down*, but doesn't *wear out*.

"But the Deacon swore (as Deacons do,
With an 'I dew vum,' or an 'I tell yeou')
He would build one shay to beat the taown
'N' the keounty 'n' all the kentry raoun';
It should be so built that it could'n break daown:
'Fur,' said the Deacon, ''t's mighty plain

That the weakes' place mus' stan' the strain;
'N' the way t' fix it, uz I maintain, Is only jest
'T' make that place uz strong uz the rest'."

Thirty years ago the automobile was a horseless carriage built of wood, castings, and bar iron. Today it stands as the crowning example of man's progress—a masterpiece of efficiency, lightness, safety, economy, comfort and functional beauty—90 per cent pressed steel—utilizing two score different non-ferrous alloys. We are approaching the poet's dream and the artist's masterpiece.

In designing press tools the basic principle of determining the successive operations and laying out the drawing dies and punches to cold-draw and flow the material, within its "ultimate strength" but beyond its "elastic limit," preserving its original thickness, texture and strength, is now frequently violated for the purpose of reducing tool and production costs. When strength and dimension tolerances can be sacrificed, such "jammings" are sometimes accepted for crankcases, gear covers, frame members, oil pans, and the like. But wrinkles, laminations, tears, warpings, and upset or stretched sections are the result and no designer is proud of such a job, even though the purchasing agent admits that his "price is in line." The material is bungled, wasted or punished beyond its ultimate strength and its next move is to the scrap pile. Cold, tough molecules will conform marvelously without injury and perform beautifully to their master's command; in fact they improved incredibly under the medieval Toledo and Damascus swordsmiths and Japanese "steel treaters," long before our chemists, metallurgists, microscopists and spectrographists began to talk so glibly about Austenite, Troostite, and Fraunhofer lines. If we work our steel as successfully as did those Sixteenth Century master armorers, we may anneal and reform it hundreds of times, as they did, and finally produce a "proof" masterpiece, serviceable for all time.

The present Iranian descendants of Damascus swordsmiths of the Middle Ages still adhere to their traditional steel but after losing to European machines their market for sword blades, they turned their talents to forging by hand crude images of cats, dogs, and other domestic animals, grotesquely decorated with brass damascened designs, that are offered us at prices that cannot yield those hand workers more than a penny an hour. Here is an example of the misuse of steel and hand craftsmanship. Even Persia needs machines.

While traveling in Switzerland some years ago, I visited the shops of the oldest Geneva watchmaker and inquired what advance they had made during this century.

Imagine my thrill as a steel worker when they showed me their best movement encased in a pressed steel case—stainless steel—the handsomest watch I ever saw. Of course I purchased it. This steel is twenty times harder than gold, ten times stronger, only half as heavy and less affected by acids or salts; is non-magnetic, retains a higher polish and I prefer the color. The cost of the material in this case was only a few cents, and saved me sixteen dollars in the cost of the watch. Whistler said that Art laughed at the dumb Swiss and left them to their cuckoo clocks, but I cite this as an outstanding example of the appropriate use of steel and proper disregard of precedent —not so dumb after all. Steel reflects a beauty and depth of sheen like a *pearl*, compared with the blatant surface luster of a diamond.

Raw material for our modern high speed presses must now be even stronger and truer than our clients require for their finished products, in order to withstand the increased processing stress imposed by mass production. This fabricating stress sets a higher standard of quality and endurance than the finished articles require. These super stampings must start with the cold rolling mill and heat treating furnaces. No stamping shop can serve the trade successfully depending on other mills, or jobbers of salvaged seconds, for their steel supply. Only tools of the highest precision, and materials accurately and uniformly rolled and tempered, produce parts at the lowest cost in mass production. Interchangeable parts are the cheapest kinds to produce nowadays, besides they reduce inspection and assembly costs.

The rolling mills produced successive lots of steel which metallurgical chemists analyzed and pronounced "identical alloys," but in our high speed multidraw presses

o o o

BEAUTY and quality of workmanship were not lacking in the craftsmanship of yesterday. But today, thanks to the evolution of the press, we have something more than that; precision and interchangeability that goes with it. Emblematic of the press is the statue dedicated to mechanics in honor of Peter Donahue, below and at the right.

o o o

duction, expressing beauty, efficiency, culture and happiness. The reason manufacturers do not now make all quantity products beautiful works of art is because the public does not demand them, not because they cannot be made. Machine parts—while designed by mechanical engineers for efficiency of production as well as for service—must be art modeled to express appropriate beauty in the finished composition. Modern engineers and craftsmen cooperate with artists toward the goal of making all useful things beautiful. Ugliness, whether expressed on canvas or on radio cabinets is an offense against civilization, and two ugly objects are twice as harmful as one; while the mass production of ugly objects for wide distribution is a matter of serious public concern.

"What cannot art and industry perform,
When science plans the progress of their toil?"

one lot succeeded where another failed. Oh for a "lie detector!" To our rescue comes the spectrograph, an instrument which records to the ten-thousandth of 1 per cent each of the 93 possible elements present in each lot of steel, and thus do modern machines discriminate, compel, and fulfill the highest standards, as well as the lowest costs of living.

Manufacturers must be realists and devote their first attention to techniques, mechanics, and functional engineering, but their products should express a correlation between efficiency of function and harmony of proportion that is deeper than surface beauty. As inventors and engineers keep on improving machines and machine products, the day will come when every home will be fully furnished with art masterpieces of mass pro-

Worn Machine Parts

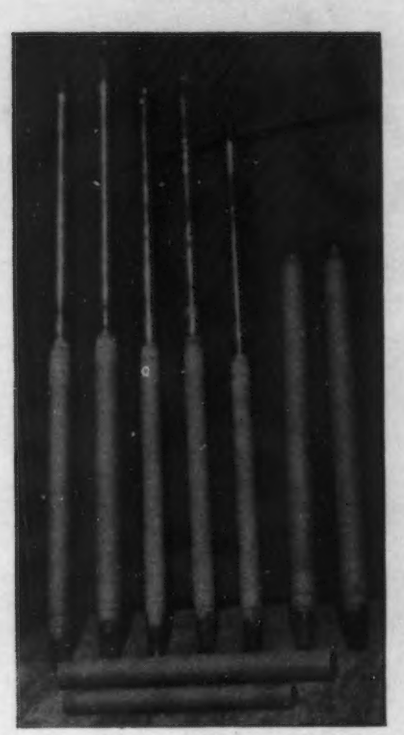


FIG. 1—Group of rods and sleeves of locomotive feed water heaters for Southern Pacific Railroad Co., Los Angeles. The surfaces have been reconditioned with sprayed Monel.

MONEL metal is now being applied to a wide variety of metal parts by means of the metal spray process. This method for the coating and resurfacing with Monel is being applied to worn machine elements, such as shafts, rods, sleeves, pins, cylinders, rolls, and the like, the primary purpose being to provide the article with a surface resistant to some particular kind of corrosion. The resistance of the sprayed Monel itself to the action of corrosive media is practically the same as that of the cast, rolled, or forged material.

Deposits 0.03 in. thick have been found to provide adequate protection to the underlying metal. In this regard, it may be said that spray-deposited Monel applied to machine parts has, over a period of years in service, proved effective in resisting corrosion in marine applications and in other equipment handling salt water and brine solutions, as well as in oil refinery service where it has come in contact with corrosive oil sludges and acid solutions. Monel, as sprayed, is slightly harder than the hot-worked or annealed alloy, which is of some importance where wear and abrasion are encountered.

The spraying of Monel, as far as the process itself is concerned, is not limited as to the type or analysis of base metal upon which the deposition can be made. When corrosion is present it is necessary to observe only the ordinary rules governing the selection of any two metals or allows to be used in contact with each other and subjected to the action of an electrolyte in order to avoid undesirable metal combinations. Monel can be bonded with equal facility to steel, cast iron, bronze, or brass, as well as to Monel itself. This, coupled with the fact that the sprayed metal may be readily finished by turning or grinding, has been largely responsible for the extended use of the spray process in applying this metal both for the protection of new parts and for the reclamation of worn or unserviceable items.

The application of Monel by spraying should be restricted almost entirely to machine elements. It is not suited for sheet, plate, and tank structures. The reason for this lies in the character of the surface necessary for the proper adherence of the sprayed metal to the underlying metal. The bonding of sprayed metal is strictly mechanical, and it is vital that the surface be roughened, and that anchorages or keyfasts be developed for the metal to lock itself to. This may be easily accomplished in the case of a shaft, or other such element, that can be revolved in a lathe, by cutting the surface with a particular type of rough V-shaped thread. Such a rough thread-cut surface is entirely adequate for the support of as much as ¼ in. to ½ in. or more of a metal like Monel. Comparatively small, flat areas can be similarly cut with a series of rough grooves by means of a shaper, but large flat, curved, or irregular areas cannot be so prepared.

A sand-blasted or steel-gritted surface provides a highly efficient bond for soft, low-melting point metals such as tin, lead, zinc, and aluminum. These methods of preparation are in common and successful use in the coating of exterior and interior surfaces of tanks and other fabricated structures with low-melting-point materials. However, such a blasted or gritted surface is not rough enough or pitted deep enough for the successful bonding of Monel or any other relatively hard, high-melting-point alloy in the required thickness of 0.03 in. This fact makes it impossible to provide adequate protection to a steel tank or vessel by depositing a sprayed coating of Monel.

Sprayed Monel has been used successfully for the circumferential build-up of all sorts of rotating reciprocating wearing surfaces on equipment handling a variety of corrosive liquids. These applications include pump shafts, impellers, wearing rings, rods, plungers and sleeves, as well as journals, shafts and cylinders having to resist corrosion in agitators, mixers, centrifugals, and in other mechanical and processing equipment.

A number of built-up Monel pump rods and sleeves from locomotive feed water heaters are shown in Fig. 1. These items range from 1¾ in. to 2¼ in. in diameter, and the rebuilt sections are from 18 in. to 36 in. in length. When these rods are reduced some 1/16 in. in

Reclaimed by Spraying

By J. S. MARTIN
Metalspray Co., Inc.

diameter by wear they are ordinarily removed from service and are readily brought back to their original size by spraying with Monel. From 5 to 7 lb. of metal are sprayed on each piece depending upon its size and the amount of wear, at a cost ranging from $8 to $12, exclusive of finish machining.

The rods are first undercut in a lathe to a predetermined diameter sufficient to clean up the worn portion, and are then cut with the usual type of rough thread. The spray work itself is performed while the rod is still set up in the lathe, the gun being mounted on the tool rest, and made to traverse the work as the piece is rotated, thus giving a deposit of uniform thickness over the length of the rod. The sprayed diameter is usually from 1/32 in. to 3/64 in. greater than the finished size, which gives ample stock for lathe finishing which may be followed by polishing with emery. An alternative method would be to finish by means of wet emery grinding.

A somewhat similar application is that of rebuilding the plungers used in hot-oil pumps in refinery service in the petroleum industry (see Fig. 2). The plungers shown are 3¾ in. in diameter and are 22½ in. long. Monel was applied by spraying to a thickness of slightly over 1/16 in. on a side over a worn length of 20 in. About 7¼ lb. of metal was sprayed on each piece. The same general procedure as outlined above for the feed water pump rods was used for preparing the surface of these plungers prior to spraying. Finishing to size was done in a lathe, 1/16 in. on the diameter being allowed for this.

The total time and material cost including both preparatory and finish machine work as well as spraying was approximately $15 each. It is of interest that the total time required was less than 4 hr. per plunger, and that the pumps in question were returned to service within a period of one day. Time is usually an important factor in the making of repairs, particularly those of the emergency class, and when it is imperative that interruption of service and resulting loss of production be kept to a minimum, metal spraying may be employed to great advantage.

Another illustrative case is the resurfacing with Monel of a set of four cast iron cylinders. These cylinders operate in a four-color printing press producing a variety of printed waxed-paper products. After being in use for a number of years the surfaces of these items were somewhat worn and scarred, and also showed evidences of attack from an alkaline corrosive to which they were occasionally subjected. The superiority of Monel over several other metals was indicated by laboratory corrosion tests, and the decision as to the metal to be sprayed was made accordingly. The cylinders are 30 in. in circumference and about 67 in. long on the printing face, the total overall length including the journals being 84 in. The spraying of two of these cylinders is shown in Fig. 3. About 37 lb. of Monel was applied to each to give a thickness of coating of 0.025 in. at the finished size, and 0.030 in. was allowed on the diameter for finishing. Seven hours were required for the completion of the spray portion of the job on each cylinder.

Accurate registration of colors is important for the production of a high-grade printed material of this type, and because of this the cylinders were finished to a tolerance of 0.0005 in. on the diameter by wet emery grinding. Each individual item came well within this specified figure and the maximum variation in diameter between any of the four cylinders of the set was only 0.0006 in. These cylinders have now been in continuous service in production for one year and recent inspection indicates that their condition is perfect.

A large number of other sprayed shaft deposits have been made which do not directly involve a wearing or bearing area. These applications have had for their purpose the restoration to size of sec-

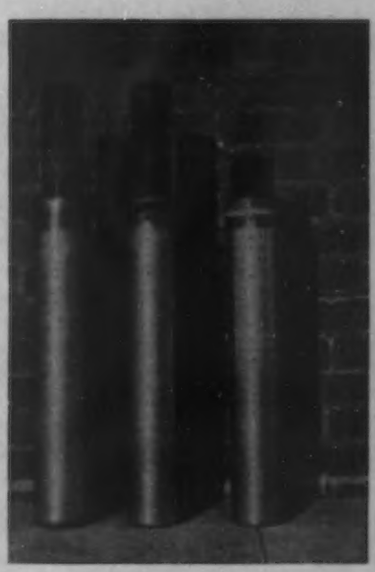


FIG. 2—Group of plungers for Union Oil Co. of California, Los Angeles. About 1/16 in. of Monel has been sprayed onto the surface.

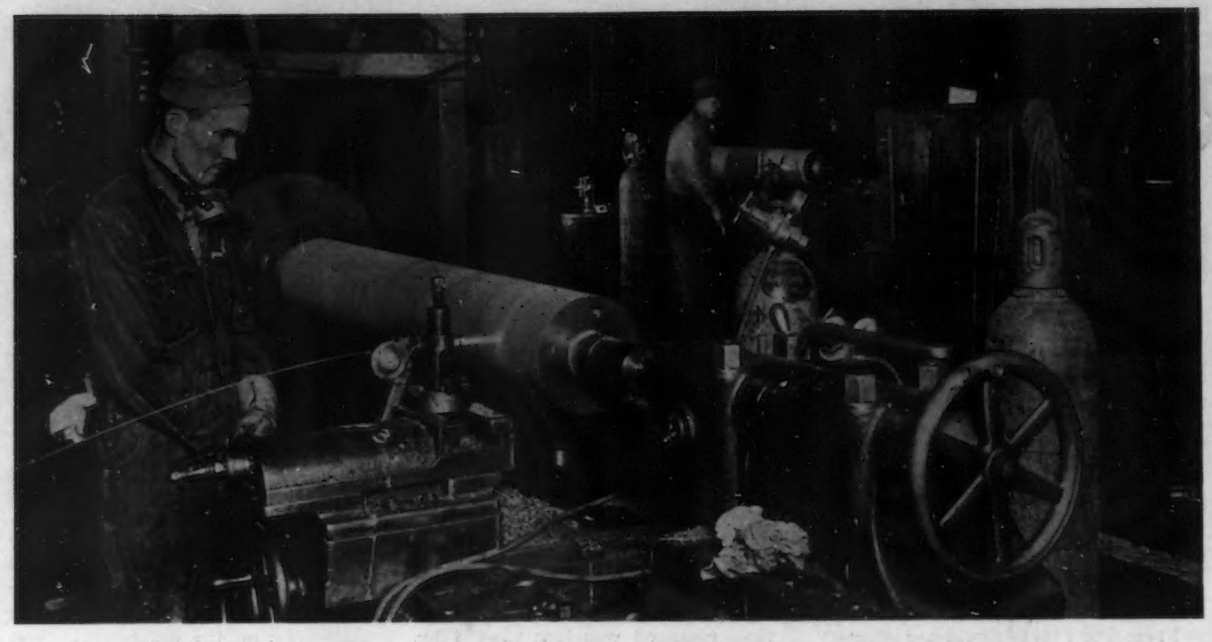


FIG. 3—Metal spraying of printing press cylinders for Western Waxed Paper Co., Oakland, Cal.

tions of Monel shafts and parts upon which the gears, impellers, pulleys, disks, etc., were to be press fitted or keyed. The bisection of a metal sprayed deposit by a keyway either in part or in whole does not in any way affect the efficiency of the bond of the deposit to the metal of the shaft. The keyway area is usually blanked off by the insertion of a dummy key during spraying, and the key removed after finishing to size is completed. Many new parts of Monel rendered unserviceable as a result of being turned undersize or bored oversize in the process of manufacture are readily reclaimed by spraying.

Welding In Marine Construction

INCREASING use of welding in marine construction was definitely reflected from the proceedings of the meeting of the Society of Naval Architects and Marine Engineers, held recently at Chester, Pa. Two formal sessions and inspection of a large tanker being built at the yards of the Sun Shipbuilding & Drydock Co., for the Atlantic Refining Co., comprised the meeting.

Details of welding, handling, and erecting large tanker units were given in a paper by J. W. Hudson, naval architect, and T. M. Jackson, chief electric and welding engineer, both of the Sun Shipbuilding company, in a paper on "Recent Practice in Welding Large Oil Tankers." The vessel described is over 18,000 tons deadweight and is 521 ft. long. The entire tank space of more than 350 ft. in length is 100 per cent welded and the authors considered that this was not the ultimate which may be accomplished by electric welding. Butt welding is used in all strength members, lap welding being used only in the case of brackets and vertical panel plates on the longitudinal bulkheads. Operating results and maintenance costs and savings were said to more than justify the extra expense, if any, in building the welded tankers.

In a paper on "Some Effects of Welding on Ship Construction," J. B. Hunter, head of hull technical division, Bethlehem Shipbuilding Corp., Ltd., Fore River plant, Quincy, Mass., pointed out that if welding takes the place of riveting in the major portions of the structures, definite modifications of shipyard practices appear inevitable. In the case of small vessels it was said that the trend is toward welding the tank spaces completely; and in the larger merchant vessels welded bulkheads both transverse and longitudinal, also major parts of the framing, small decks and flats are being generally welded.

Discussion of these papers indicated enthusiasm for the advantages of welded construction, although need for further research and experimentation was recognized.

Otis Steel Co. has awarded a contract to the Rust Furnace Co., Pittsburgh, for a single-hole soaking pit 10 ft. x 16 ft. with a capacity of 10—24 in. by 48 in. ingots. It will operate on either blast furnace or natural gas.

The Scrap Price, Spout Iron Cost Problem

By WILLIAM A. PHAIR
The Iron Age

A PRACTICAL discussion of the recent trend toward high scrap percentages in cupola mixtures, and the effects of today's raw material prices on the costs of such mixtures.

EARLY in 1934, when No. 1 machinery scrap was selling for $11.70, and 2X foundry pig was quoted at $20.20, many foundries turned their attention to the possibilities of reducing the cost of spout iron, through the use of high percentages of scrap in their cupola mixtures. Although many plants had previously experimented with high scrap ratios, it was not until 1934 that the practice received such nation-wide attention.

These efforts at melting high scrap ratios have led to a number of advancements in cupola practice. Perhaps the most noteworthy development of this period was the extensive acceptance of soda ash purifiers as a means of overcoming many of the difficulties encountered in melting high scrap percentages. The credit for the discovery of the practical application of soda ash as a desulphurizer, should be given to Dr. Richard Walter of Nuremburg, Germany. Our own Dr. Moldenke, in discussing the various methods of diluting the sulphur content of iron mixtures, advocates the use of soda ash as the most practical means of doing this. He advises the use of a quantity equal to one-half of one per cent of the weight of the iron.

When melting high scrap ratios, the problems confronting the melter may be listed briefly as:

A—Reducing the high sulphur content of the iron.
B—Cleansing the metal and providing for the expeditious removal of the increased amount of slag.
C—Providing the soda ash with proper working conditions, particularly with respect to the time element.
D—Providing constant access to clean metal.
E—Compensating for the deficiencies in the scrap of the two very important elements, silicon and manganese.

Problem A and B may be satisfactorily covered by the use of soda ash. Soda ash has a definite effect in reducing the sulphur in the casting. The addition of the soda ash to the charge and to the iron in the mixing ladle, not only has the effect of reducing the sulphur, but it also imparts an added fluidity to the slag and the iron. Soda ash added to the mixing ladle collects the slag in a bath which floats on top of the molten metal, from whence it may be either skimmed off, or backed off by tilting the ladle backwards.

Problem C and D may be covered by the use of a forehearth, a spout forehearth or a teapot mixing ladle.

The most economical and practical means of settling problem E is by the use of ferroalloy additions to the charges, apportioned by weight. The use of these additions requires extreme skill in judging the analysis of the scrap, in order to determine the Si. and Mn. additions required to secure a desired analysis in the castings. Ferroalloy additions in the hands of unskilled men can cause considerable variances in the day to day analysis of the iron.

Occasionally difficulty is experienced in machining, when high scrap ratios are used. If the silicon is carried at a minimum of 2.20 per cent, and the other elements are properly balanced, the resulting metal is quite easily machined.

In 1934, the average price difference between 2X Pig and No. 1 machinery scrap in the Philadelphia district, was $8.50 per gross ton. In the first quarter of 1937, this difference was but $4.88 per gross ton. The reduction in the price spread has had an important bearing on the economies that may be utilized by melting high scrap ratios. Cost reductions enjoyed by

An Analysis of Melting Costs Based on Raw Material Costs Prevailing in 1934

A—50 per cent pig.
50 per cent scrap.
3000 lb. charges.

1500 lb. of pig	$13.53	
1500 lb. of scrap	7.83	
Cost of one charge	$21.36	

B—75 per cent scrap.
25 per cent pig.

2250 lb. of scrap	$11.75	
750 lb. of pig	6.93	
Additions: silicon	.35	
manganese	.17	
Purite	.32	
Extra labor	.10	
Cost of one charge	$19.62	
Cost of one charge, 50:50 ratio		$21.36
Cost of one charge, 75:25 ratio		19.62
Difference		$1.74

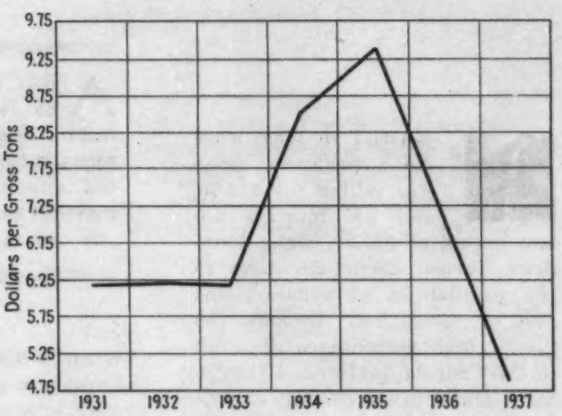
Scrap at $11.70 per gross ton.
Pig at $20.20 per gross ton.
Pig used in 75:25 ratio carries 3.00 silicon and has a 50 cent differential per gross ton.

Test Bar Analysis

Si.	2.29	2.31	2.33	2.33
Mn.	.64	.60	.62	.62
S.	.102	.105	.103	.102

Purite used in charge and mixing ladle.
75 per cent scrap.
25 per cent pig with 3.00 Si.
Ferro-silicon and manganese added to charge.
Average loss under 5.3 per cent.

THE chart at right shows the varying spread in dollars per gross ton, between prices of 2X Foundry pig iron and No. 1 Machinery scrap. This differential is the prime factor in all cost comparisons of high- and low-scrap content cast iron.



An Analysis of Melting Costs Based on Raw Material Prices Prevailing in First Quarter of 1937

A—50 per cent pig.
50 per cent scrap.
3000 lb. charge.

1500 lb. pig	$16.16	
1500 lb. scrap	12.89	
Cost of one charge	$29.05	

B—75 per cent scrap.
25 per cent pig.

2250 lb. scrap	$19.33	
750 lb. pig	8.25	
Additions: silicon	.35	
manganese	.17	
Purite	.32	
Extra labor	.11	
Cost of one charge	$28.53	
Cost of one charge with 50-50 per cent		$29.05
Cost of one charge with 75-25 per cent		28.53
Difference		$0.52

Scrap at $19.25 per gross ton.
Pig at $24.13 per gross ton.
Pig used in 75:25 ratio carries.
3.00 Si. and a price differential of $0.50 per gross ton.

the increased use of scrap in the mixtures, are directly proportionate to this price spread. The greater the spread, the greater the economies and inversely, the smaller the spread, the less the savings. The point where the economies are negative will depend upon the practice of the individual foundry, and can be determined only by a careful cost study.

The accompanying charts and tables are based on the practice of a stove plate plant in the Philadelphia district. This foundry has been successfully using "Purite" as a purifier for a number of years. Early experiments had worked the scrap percentage up to 93 per cent (with silvery pig iron), but careful analysis of all the factors involved pointed out 75-25 per cent as the ideal ratio.

It will be noted that the cost of coke and limestone has not been considered in the comparative cost tables. In discussing the coke and limestone question with various foundrymen using soda ash, there was no general agreement as to whether less coke or more coke was required with high scrap ratios. The consensus of opinion was that the coke ratio depended upon the size of the scrap used, its condition, and various other factors which vary in each individual foundry.

The use of high scrap mixtures sometimes requires the use of higher silicon pig iron. In the plant covered by the accompanying tables, 3 per cent silicon pig is used. This pig carries a 50c. per gross ton penalty over the iron required with a 50:50 ratio.

High scrap mixtures present a problem in storage and handling

which was not taken into consideration in computing the costs in this manuscript. The labor item on the cost tabulations covers the direct labor involved in handling and charging the ferroalloy additions only. The loading and weighing of a charge of scrap, when done manually, requires more time than that needed to load a pig charge. Hence the number of charges a man can make up in a given period is greatly reduced, thus increasing the labor cost per charge. This also holds true when the raw material is unloaded from freight cars by hand. These extra costs should be seriously considered when comparing the costs of the various ratios. The use of soda ash sometimes necessitates the use of additional labor in front of the cupola. Melting large quantities of scrap involves other labor costs which are difficult to isolate because they are spread lightly over various foundry departments. In the whole these costs represent a figure to be seriously considered. One foundryman pointed out that the majority of accidents incurred by the charging gang were incurred while handling scrap.

In considering the possibility of returning to more equal scrap ratios, the advisability of continuing the use of soda ash in the mixing ladle, if not also in the charge, should be given serious study. In a boiler plant, melting with a 55:45 ratio, the use of soda ash in the mixing ladle resulted in a decrease of 0.03 per cent in the sulphur analysis of the iron over the same ratio, but untreated, mixtures.

It is the writer's opinion that foundrymen would profit by adjusting their cupola mixtures according to the spread between the cost of their pig iron and their scrap iron, also seriously considering the question of whether or not the use of high scrap ratios increases their labor costs.

TYPE of covered teapot mixing ladle required for the successful use of soda ash cleansers in the ladle. That shown is in a stove plate foundry melting 75:25.

Republic Steel's New Continuous Mill Layout at Cleveland

THE new buildings which will house Republic Steel Corp.'s new 98-in. continuous sheet and strip mills are rapidly nearing completion. There are three main buildings ranging from 900 to 1800 ft. in length.

Typical Arrangements of Belt Conveyors

o o o

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

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CHAPTER 14 of a comprehensive series on Materials Handling Methods and Equipment.

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WHEN the superintendent of National Cash Register Co. at Dayton, Ohio, was asked to describe the materials handling system he had helped to design and install in that plant, coordinating the flow of production through 22 buildings covering many acres, he took this thought as his theme:

"Twin illusions in the minds of most production executives surround the question of materials handling by mechanical means. The first is that a materials handling *system*, as distinguished from a few scattered pieces of mechanical equipment installed here and there in the plant, is applicable only in a large plant making a small variety of products. The second is that the whole tribe of mechanical assistants for moving jobs—conveyors and chutes and hoists, trucks and tractor-trains and tiering mechanisms, and all the rest of the invaluable family known generically as materials handling equipment—can be employed to really good advantage only in a factory where a succession of processes is laid out on one or two floors, and practically under one roof. The plant manager who believes these doctrines cites in substantion thereof the fact that the automotive industry, where materials handling is developed to its greatest degree of perfection, falls neatly within the limitations laid down."

These twin illusions he then promptly tore to shreds, by detailing the economies effected through the carefully planned and intelligently coordinated system of handling installed in his plant; serving multi-storied buildings widely separated, where literally thousands of operations were performed on brass and gray iron castings, cabinet steel, small punching steel, screw stock and wood stock; in the manufacture, assembly and finishing of several hundred models of cash register equipment. In this coordinated system there are included many varieties of handling equipment, falling under such general heads as industrial railways, motor truck and trailers, industrial trucks, hand trucks, chain, belt, slat and gravity roll conveyors, elevators and chutes.

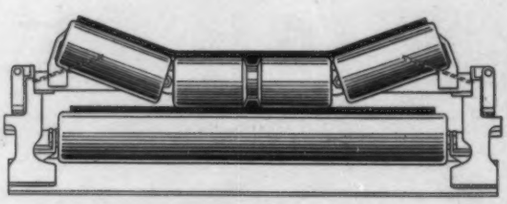


FIG. 1—Link-Belt self-guiding belt conveyor. A raised ridge running along the center line of under side of belt fits a groove in the idler rollers.

This 42-acre plant now operates substantially as one unit, steadily and methodically. Stock is delivered uniformly and quickly. No department is swamped with parts while in another, workmen stand idle awaiting supplies. The advantages that are a part of straight line production have been attained. Lamson conveyors tie the entire assembly and final inspection operations smoothly together. Before the conveyors were installed 2100 registers were generally in process of assembly all the time. This number has now been reduced safely to between six and seven hundred. The assembly cycle has been reduced from two weeks to between four and five days. The superintendent believes that the conveyors have effected savings in the use of floor space estimated at 54,000 sq. ft. The conveyors linking four of the buildings together through a central switch tower that provides for complete intercommunication and transfer between every department housed in these buildings, carry more than 2,500,000 boxes of parts each year.

It is probable that no single type of materials handling equipment will ever serve all handling

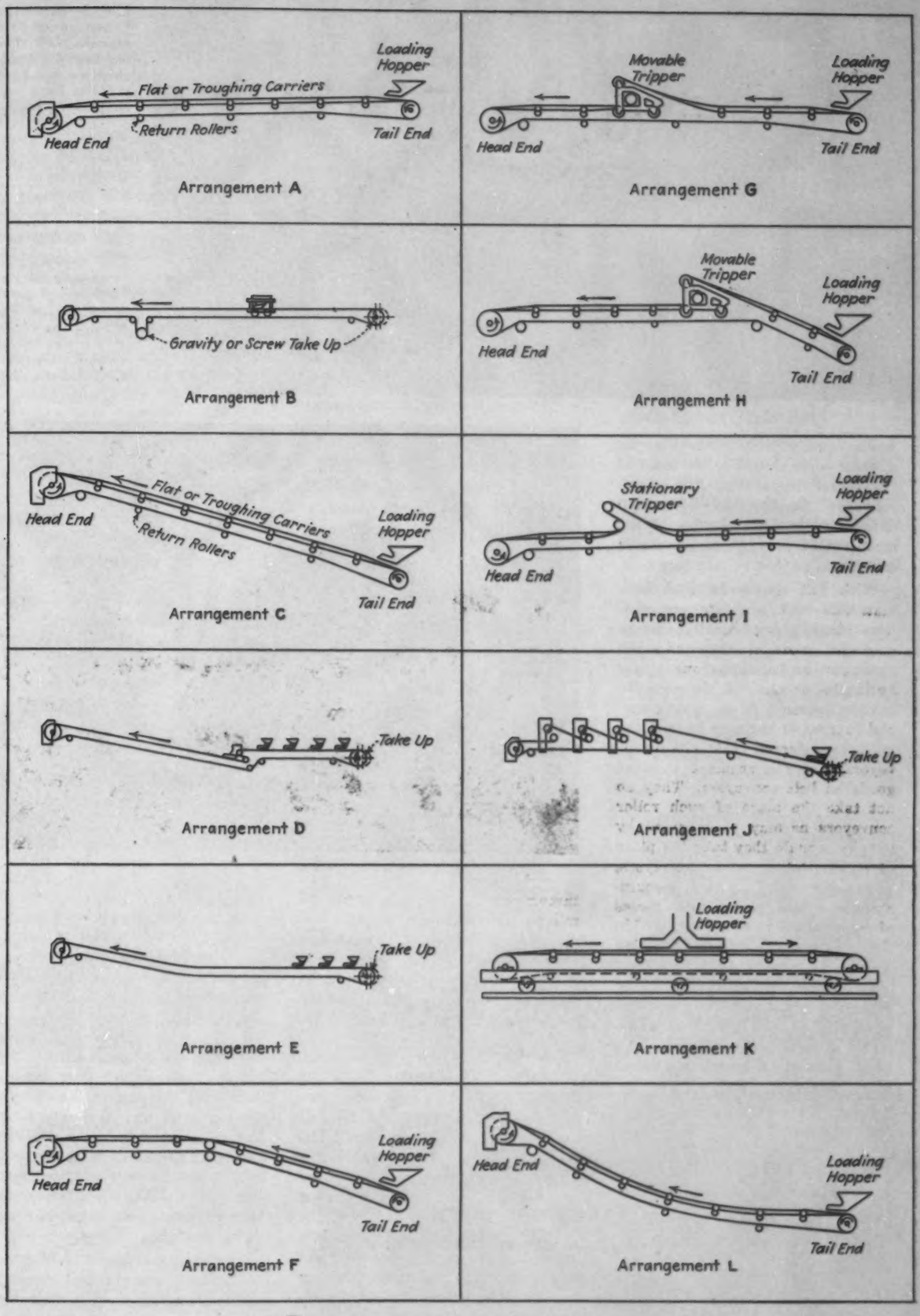


FIG. 2—Typical Arrangements of Belt Conveyors.

AT LEFT

FIG. 3—Lamson flat belt conveyors in ceramics plant, showing how diversion strips switch commodities from one conveyor to another.

o o o

BELOW

FIG. 4—Robins belt conveyor lifting 1,000 tons of molybdenum ore per hour 54' in a run of 200' at Climax Molybdenum crushing plant, Climax, Colo.

needs equally well. Conveyors as a whole come closest to the ideal of "universal" apparatus. And of the conveyor family, the sons and daughters that are capable of the most varied services are the belt conveyors.

With belt conveyors, both bulk materials and separate commodities ranging from small parts to packaged goods, in large and small sizes, can be handled along either horizontal or inclined planes without the necessity of employing special fixtures or carriers to hold the goods transferred. Like chain conveyors, power is required to move goods on belt conveyors. They do not take the place of such roller conveyors as may be operated by gravity, nor do they take the place of roller, slat or apron conveyors, power-operated, under circumstances where heavy unit pieces of material are to be moved. Within their range of service, however (which is amazingly wide), belt conveyors do thousands of handling jobs most acceptably and most economically. A few typical arrangements of belt conveyors, and a very small number of typical industrial plant conveyor jobs, will be described here, as an indication of the range of service rather than as an attempt to cover the whole subject completely.

Belt Conveyor Design

Fundamentally, a belt conveyor consists of a heavy, endless belt, generally built up of layers of rubberized cloth, passing over two or more end pulleys (one of which is connected to a source of power to make the belt move) and supported throughout its carrying length on rollers. The belt may be flat (supported by straight cylindrical rollers) or troughed (supported by rollers set in such fashion as to cause the belt to assume a trough-section). A recent development designed to keep a very long conveyor belt running true over the idler (or supporting) rolls is shown in Fig. 1, which illustrates the principle of the new Link-Belt self-guiding belt conveyor. The belt carries on its under side a raised ridge, running along the center line. The raised ridge fits a groove in the middle roller of the supporting idler, and therefore runs straight on the idler rolls and end pulleys at all times, both on the carrying travel and on the return travel.

The supporting idler rolls are spaced equally throughout the length of belt travel, according to the type of load the belt is designed to carry. The two main pulleys, at the far ends of the belt, are termed respectively foot or tail pulley, at the receiving end, and head pulley, at the discharge end. The belt may be driven from either end, but is usually driven from the head end, since this makes the carrying section taut and the return section of the belt loose, or slack. A tail-end driven belt would have the return section taut and the carrying section slack, which, under certain circumstances might be found to be desirable.

In Fig. 2 are shown 12 diagrams of typical conveyor belt arrangements, ranging from simple horizontal transfers to complicated feeding and discharging set-ups.

A consideration of these arrangements will show many of the handling possibilities available.

Arrangement "A" is a horizontal conveyor — the simplest arrangement of all. If the belt is flat it is adapted to package handling, fine bulk materials transfer, or the moving of such parts up to fair unit size and weight as have at least one flat surface. Goods may be placed directly on such a conveyor by hand, or they may be received automatically from other conveyors. Goods may be removed either by hand, or diverted off the belt by plows, or baffle plates, into bins, onto receiving tables, or onto side conveyors. Bulk materials such as coal, coke, gravel, stone, etc., are usually fed from a hopper or chute onto trough-section belt conveyors. Loading is done at the tail end, or at various points along the conveyor, from chutes; and the discharge may be at the head end, or through trippers stationed along the line of travel.

In arrangement "B" a traveling hopper is used to feed bulk materials from overhead bins to a trough conveyor at various points, whence the conveyor discharges by a continuous dumping process at the head end. By having a number of such hoppers feeding from different bins simultaneously, predetermined quantities of different materials are received simultaneously by the belt, which takes them to a common point for mixing.

In arrangement "C" we have arrangement "A" adapted to an inclined movement, with the discharge at the head end on a higher level than the loading point.

Arrangement "D" adds loading from several bins, separately or simultaneously, to arrangement "C." Arrangement "E" is a modification of "D" with the bins so placed as to permit of the use of a curved incline.

Arrangement "F" is a combination horizontal and inclined conveyor, with a tripper on the horizontal section. A tripper is a device, either fixed or movable, through which the conveyor belt runs, and by means of which the belt is lifted, spilling its load to chutes which take the material away to one or both sides of the belt, into bins, or onto side conveyors. Trippers are adapted to coarse bulk materials only. On flat belts handling fine bulk materials such as sand, cement, etc., plows, or diversion plates riding on the belt at an angle to the belt travel, will do the same thing just as acceptably and at lower cost.

Arrangement "G" is a simple horizontal conveyor with a single movable, or traveling tripper. "H" is a modification of "G" with the loading point inclined to permit of the widest possible range of travel of the tripper. Arrangement "I" is another modification of "G," with material discharging at intermediate points by means of fixed trippers.

In arrangement "J" we have an elevating and distributing conveyor discharging into bins by means of automatic fixed trippers.

Arrangement "K" shows a reversible shuttle belt conveyor designed to receive the materials anywhere along the line of the conveyor, and to discharge at either end.

Arrangement "L" is a combination horizontal and inclined belt conveyor joined by a long, sweeping curve; receiving at the tail end and discharging at the head end.

The movements diagrammed do not exhaust the possibilities of simple and combination layouts of belt conveyors. They merely show the fundamental principles around which scores of different designs

ABOVE

FIG. 5—Conveyor belt, traveling tripper, and bucket elevators on ship-crane all working together to put coal in a ship's hold. Photo courtesy Conway Clutch Co.

o o o

AT RIGHT

FIG. 6—Four Robins coal-mixing belt feeders draw four kinds of fine coal from hoppers and deliver to a storage-feeding conveyor in a coke-preparation plant.

FIG. 7—Traveling tripper spills belt-handled crushed stone into side bins in this Jeffrey conveyor installation in a large cement plant.

are built. Like Old Man River, a belt conveyor just "keeps rolling along," a willing and ever-capable beast of burden, ready to take on its load in many different ways, and to discharge it wherever and whenever you find it most convenient. It is an ever-moving highway which, the more you make use of it as an artery of traffic, the better it serves to keep the life-blood of production in healthful circulation. (A mixed metaphor, perhaps. but true, nevertheless!)

Description of Equipment

Working from simple examples to more complex installations, Fig. 3 shows a Lamson belt conveyor installation in the ceramics plant of Mt. Clemens Pottery Co., at Mt. Clemens, Mich. Particularly interesting here are the diversion plates, which serve to switch goods traveling towards the observer on the left-hand conveyor to the cross conveyor and thence to the right-hand conveyor traveling away from the observer. This is all very light equipment, requiring but little power to operate.

Fig. 4 shows a 54-inch-wide Robins belt conveyor, about 200 feet long, lifting 1,000 tons of molybdenum ore per hour to a height of 54 ft. 6 in., at the No. 2 crushing plant of Climax Molybdenum Co., Climax, Colo. This is a fairly steep grade, and the service is rough in the extreme. The conveyor design is still fundamentally simple, however, consisting of a trough-section belt on a straight incline.

Fig. 5 shows a trough-section belt carrying coal along a wharf to a point where a traveling tripper removes it from the belt to the bucket-elevator equipment of the ship-loading crane. Note here the completely automatic nature of the operations, once set going in the proper locations. The tripper can be moved on its rails to any desired point along the belt conveyor; the ship-loading crane can be moved on its rails to any desired point along the wharf to reach the hold of the ship being loaded. Once lined up, the coal moves without any further human supervision from belt conveyor through the tripper to the bucket elevators of the crane and into the ship's hold, continuously, until the hold is filled, or the supply exhausted.

Fig. 6 gets into the realm of higher accountancy with a bang. It shows a set of Robins coal-mixing belt feeders in the coke plant of the Donner Hanna Coke Corp., at Buffalo, N. Y. Four feeder belts draw off pre-determined quantities

FIG. 8—A Jeffrey sand conditioning installation illustrates the use of plows to remove sand to storage bins from a flat conveyor belt.

FIG. 9—A Robins traveling distribution tower picks up salitre at 250 tons per hour from a trunk line belt conveyor and distributes it to either side in storage piles.

of four kinds of fine coal from overhead hoppers, delivering at a common central point to a belt conveyor which feeds a storage bin located above the oven-charging larry car on the floor below. By setting the bin gates, and regulating the speeds of travel of the different feeder belts, any required proportions of the four different kinds of coal may be automatically mixed by these conveyors and delivered to the storage bins.

Fig. 7 shows the action of a belt tripper of the movable kind on a Jeffreys installation in a large cement plant. The tripper is mounted on the rails running along either side of the conveyor idler rolls, and thus may be moved to any location along the conveyor line. The conveyor belt runs through the tripper, being raised by it above the supporting idler rolls. At the high point of the lift, the belt descends vertically, spilling the material handled onto a chute, which delivers it to a bin located alongside the conveyor, or to a cross conveyor, as desired. At the bottom of the vertical descent, the belt runs under a straight roller located just above the line of the idler rolls on the continuation of the conveyor, and then continues on its way to the head end of the conveyor, dimly seen in the far background of the illustration.

As has been said, on a flat conveyor handling fine bulk materials, a plow will serve the same purpose as the more complicated tripper mechanism. Two such plows are shown in the non-operating position, in the Jeffreys sand-conditioning installation illustrated in Fig. 8. In this picture the conveyor belt is moving toward the reader and the nearest plow has just been lifted away from the belt. When the plow is resting on the belt, it diverts the material carried, delivering it to the storage bin at the far side of the conveyor. The furthest plow shown serves another storage bin.

An interesting example of the tripper mechanism carried to the ultimate pitch of automatic action is shown in Fig. 9. This Robins installation at one of the plants of the Anglo-Chilean Nitrate Corp. in Chile, handles salitre at the rate of 250 tons per hour. A traveling distribution tower containing a high level tripper picks up a trunk line belt conveyor, and delivers the saliter from it to two belt conveyors built into the distributing booms, for deposit onto the ground piles at either side. The distribution tower can be moved along rails to any desired point in the yard, and thus caused to build up storage piles at various places, or along a continuous line.

(The next article in this series will cover flight conveyors, and their allies, bucket elevators and skip hoists.)

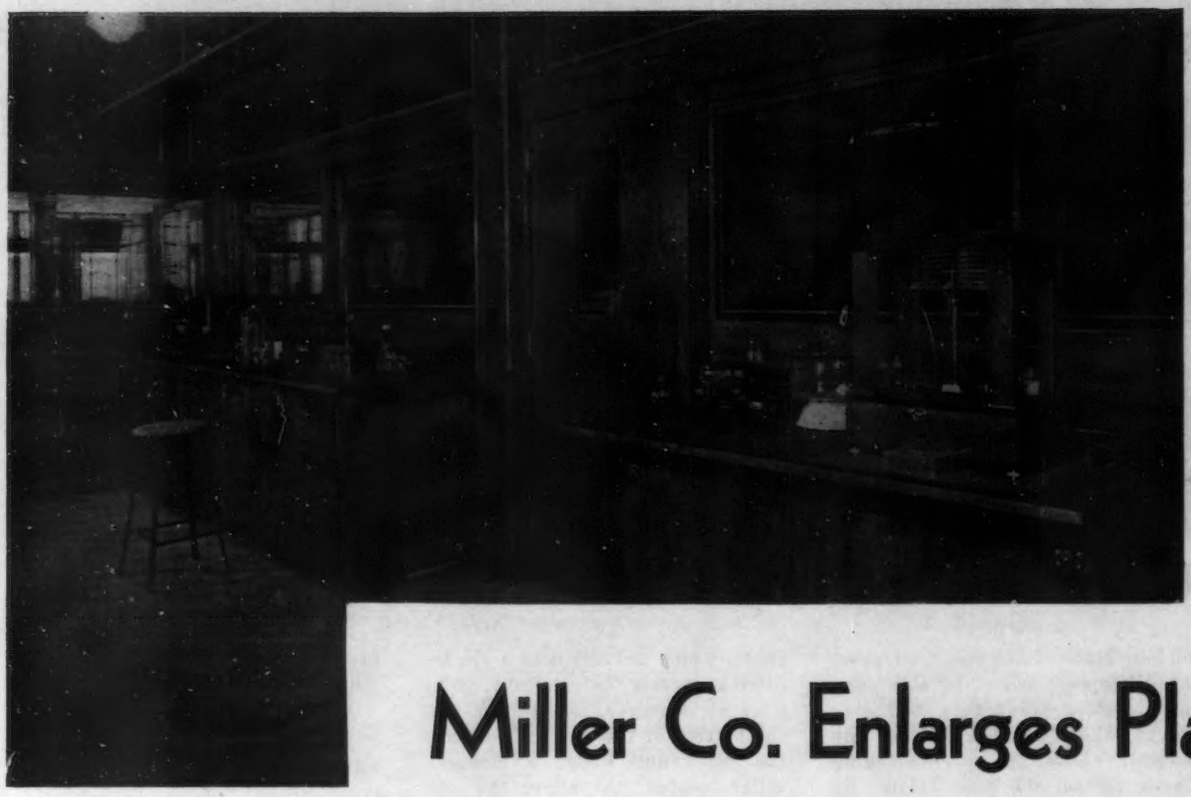
30,000,000 Steel Drums Made in 1936

THIRTY million steel barrels, drums and packages were produced last year as containers for oils, chemicals, paints and a wide variety of other commodities, according to estimates received by the American Iron and Steel Institute. That total is in addition to the more than 17,000,000,000 sanitary cans made from tin plate produced by the steel industry during 1936.

More than 287,000 gross tons of steel sheets were consumed in producing that number of barrels and drums, it is estimated.

About 60 per cent of that tonnage of steel was used to produce the standard 55-gal. drum widely used as a container for oil and kerosene. A total of 7,300,000 drums of this type was produced during the year, while 3,700,000 steel drums and barrels of other sizes were produced, accounting for about 25 per cent of the tonnage of steel going into containers other than sanitary cans.

The remaining 15 per cent of the tonnage was consumed in producing between 18,000,000 and 20,000,000 smaller "steel packages," ranging from one to 12-gal. capacity. These were used as containers for paints, putty, printing inks, alcohol, oils, lacquers, etc.



Miller Co. Enlarges Plat

ABOVE

A CORNER of the new metal cleaner research laboratory of the J. C. Miller Co., Grand Rapids, maker of electroplating and polishing equipment and supplies.

o o o

FOUR years ago the J. C. Miller Co., of
laboratory for job plating shops in the
ting up their own laboratory and staff.
development of new compounds and
larged facilities shown on this page. Not
room available to customers as well as
sist of filters, cleaners, buffs and buffing
A specialty has been plating

o o o

IN the analytical laboratory routine analyses are made of plating solutions and control tests are made of the company's products.

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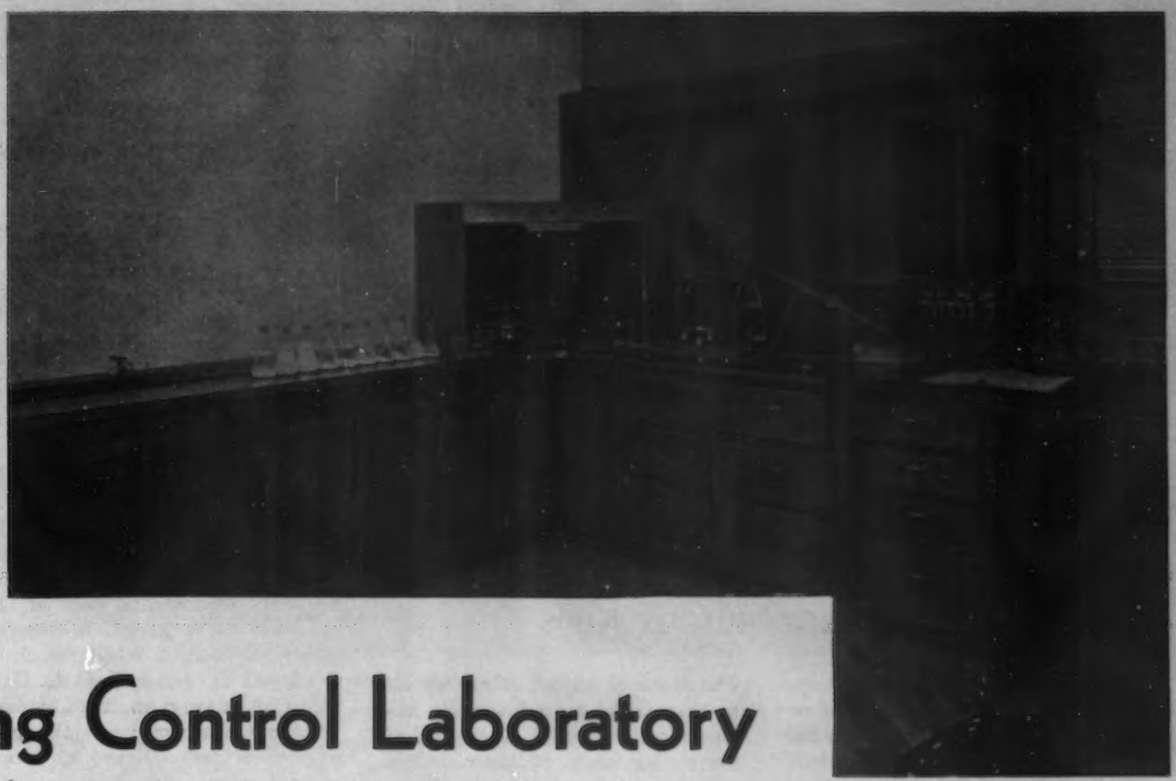

ing Control Laboratory

Grand Rapids, Mich., started a small control
vicinity that were too small to warrant set-
Growth in the routine analytical line plus
solutions led to the construction of the en-
shown is the technical library and reading
the staff. The company's products con-
compositions, plating chemicals and anodes.
techniques developed for die castings.

ABOVE

BELOW and behind the row of flasks at the left are a row of tanks for carrying on electrolytic research and commercial development work in plating. Cleaner, rinse, acid dip, copper, nickel and chrome tanks are included.

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o o o

DEPTH-OF-PLATE measurements and examination of structure are made under the microscope in the metallographic section. Rough polishing belts are seen in the foreground, with the final polishing disk and leregated alumina bottles to the left.

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THE welding equipment consists of a generator car, a rack car, and a welding car. The generator car (at left) houses two turbines, the steam for which is supplied by a locomotive.

Mobile Resistance Welder Forms Long, Continuous Rails

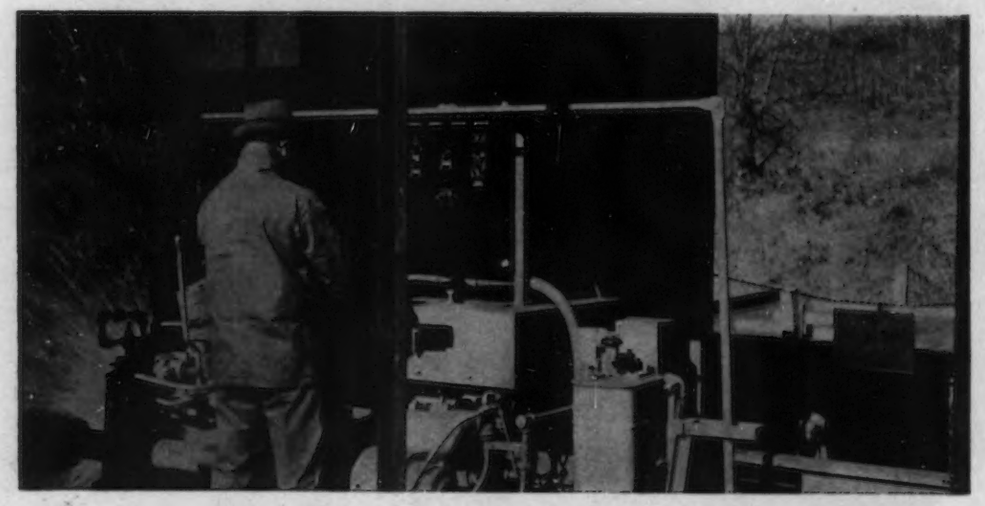
THE accompanying illustrations show new mobile equipment recently put into operation by the Sperry Rail Service for flash butt welding the ends of rails together to form one long, continuous rail. The equipment is said to make easily possible the use of continuous rails more than a mile in length. It is housed in specially built railroad cars and can be moved readily from one location to another, as the job requires. Development of this resistance method is said to be a result of considerable research and experimental work on the part of the Delaware & Hudson Railroad, Sperry Products, Inc., and the General Electric Co.

When the conventional joint between two rails begins to wear, a low spot or depression is formed. The shock or impact of car wheels as they strike these low spots has an appreciable effect on the life of the rolling stock, adding considerably to maintenance costs. Thus, worn or battered rail ends have been a source of considerable expense to railroad operators. Such rails either have to be built up by welding or replaced, and either remedy is directly reflected in high maintenance costs.

The welding equipment as operated by Sperry Rail Service consists of a generator car, housing two turbine-generators; a rack car, which holds rails in tiers preparatory to welding; and a welding car, where the actual joining of the rails takes place. A locomotive supplies steam to the turbine-generators.

Power rollers carry the rails from the rack car into the welding car. Here, the first step is preheating. One end of each of the two rails to be joined, is clamped in a fixed position, while the other is allowed to remain movable. Current clamps are connected to a low-voltage transformer and the preheating is accomplished by intermittent short circuiting between the two faces. After preheating, the high spots on the rail ends are burned off by continuous short circuiting. After a predetermined amount of this "flashing," the faces are brought together under great pressure. The molten metal squeezes out and the butt weld is made between the plastic faces. The welded rail is then heated again to relieve stresses caused by welding and, finally, the weld is ground flush with the rail.

Strings of flat cars are employed to transport the long rails to the desired location. Contrary to the expectations of laymen, the rails



INSIDE of welder car where the rails are joined. Rail ends are first preheated, then joined by welding, then heated to relieve stresses, and finally, the weld is ground.

o o o

PART of the rack car showing the rails stacked prior to welding is pictured at the right. The rails are conveyed from this car to the welder car by means of power driven rollers.

o o o

move easily around curves, bending to conform to the shape of the track.

Flash butt welds produced by the Sperry equipment have stood up under the severe conditions imposed by a 65,000-lb. wheel load for more than 6,000,000 cycles without any sign of failure. This test, which follows similar tests developed by the University of Illinois, is said to be equivalent to an actual service of extremely heavy wheel loads over a period of many years.

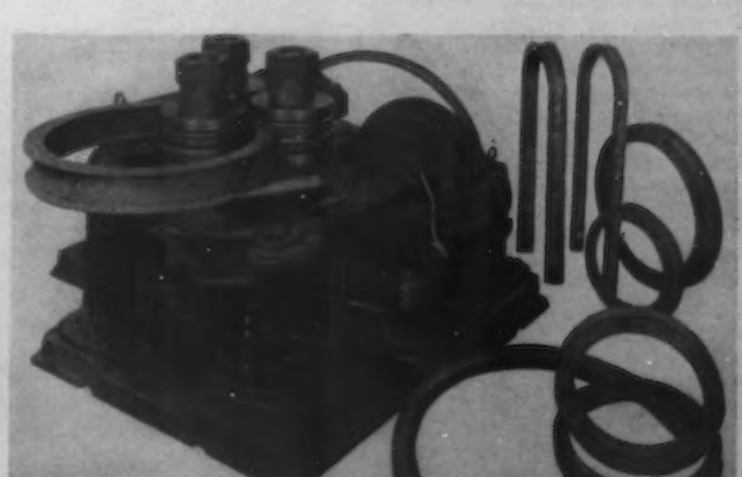
Bending Roll for Angles and Other Shapes

THE horizontal angle bending roll illustrated is being offered by Kane & Roach, Inc., Syracuse, N. Y., not only for bending of angles but for I-beams, rails, channels, flats, squares, tees, octagons, hexagons, Z-bars, rounds, pipe, tubing, and special shapes. It is designated as the No. 23.

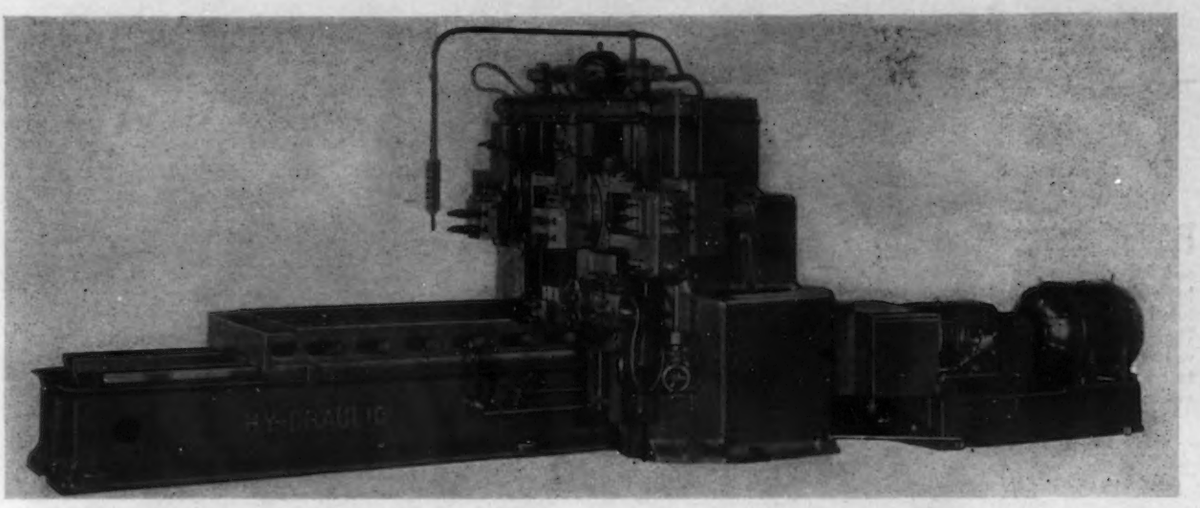
The front roll can be adjusted in and out to vary the diameter of the circles. Generally, this is accomplished by manual operation of the adjusting screw, but the machine can be furnished with power drive to the "pressure adjustable" roll shaft. A quick release is provided on the latch lock, and the pressure-adjustable roll shaft can be quickly swung open, to remove bent sections from the roll passes.

Quality of bend obtainable is emphasized. The design is such as to provide an edge bearing on the vertical leg of the angle when bending angles leg in, thereby relieving the excessive strain on the horizontal leg. In addition, the edge bearing plates are tapered, so that the legs of the angle remain square and the horizontal leg remains parallel to a straight-edge laid across the face of the circle. Plates of this type can be furnished for all size angles, and are required only when bending angles, leg in, to small diameters. The machine has a production speed of approximately 18 to 27 ft. per min., but on light sections it can be operated at 50 to 75 ft. per min.

The main drive motor on the unit illustrated is a 30-hp., d.c. shunt wound rotor motor, variable-speed, 1150-1725 r.p.m. A separate 15-h.p. motor is provided for the power adjusting screw. Both motors are directly connected to reduction gear boxes of the inclosed type, with all gears run in oil. The machine is provided with a one-shot lubricating system.



SHAPES, including specials, rails, pipe and tubing can be bent on this angle bending roll.



Heavy-Duty Double-Housing Planer Operates Hydraulically

A DOUBLE-HOUSING hydraulically-operated planer for heavy-duty applications has been added to the Hy-Draulic line of open-side planers and shapers built by the Rockford Machine Tool Co., Rockford, Ill. Use of a standard constant-speed motor instead of the reversing electric motor common to heavy-duty planer drives is an outstanding feature. This motor is directly connected with the hydraulic power unit, which, in turn, drives the table and actuates the feeds.

Other advantages claimed for the hydraulic drive include instant reaching of selected rate of table cutting speed and the maintaining of that speed throughout the entire cutting stroke. Reversals of table movement are quick and smooth, and short strokes can be made at about shaper speeds. The cutting speeds are independent of the return speeds and both have infinite adjustment between high and low limits. The table can be stopped, inched or reversed at any point in its travel and the hydraulic system employed is said to prevent coasting. It is stated that the hydraulic drive results in a marked increase in tool life between grinds.

Cross-feed to the heads is also hydraulic and can be adjusted to any desired amount between maximum and minimum. The feed takes place while the tool is clear of the work, before entering the cut. The table drive is protected by a safety valve.

A pendant push button station located as shown permits convenient control of the direction of rapid traverse of the rail heads, elevating or lowering of the rail, the operation of the master motor switch, and the instant stopping of the entire machine. Power elevation of the rail operates in conjunction with an automatic hydraulic rail clamp. Power rapid traverse to all heads is provided by a direct-connected motor.

Cutting speeds and table rapid return can be adjusted by means of handwheels located on each side of the hydraulic power unit. Hydraulic feed can be adjusted by means of a ball crank easily reached from the operator's working position.

The cross-rail is a single casting in the form of an inverted U, and has long vertical bearings on the accurately scraped ways of the column. One shot pressure lubrication is provided for the rail heads, as well as for side-heads and feed units. Hydraulic tool lifters are a feature; their smooth action is said to prevent any tendency to jar tool slides out of adjustment.

This 48 x 48-in. hydraulic planer is built with table lengths ranging from 9 to 19 ft. The width of the table is 44 in. Maximum distance from table to rail is 48½ in. and maximum travel of the rail heads is 55 in. Table speed of the heavy duty machine ranges from 0 to 40 ft. per min. and return speed from 10 to 150 ft. per min.

Midget Alternating-Current Welder

FOR maintenance and repair as well as light construction welding, the Westinghouse Electric & Mfg. Co., East Pittsburgh, is offering a new low-cost a. c. welder designated as the Midget Marvel. Operating efficiency averaging 87 per cent at normal loads is claimed.

Current range of the sets is from 30 to 140 amp. with 12 steps of current adjustment. The secondary open voltage is 50 on low range and 55 on the high. The primary current input for welding at 140 amp.

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CURRENT range of these Midget a.c. welding sets is from 30 to 140 amp., with 12 steps of adjustment.

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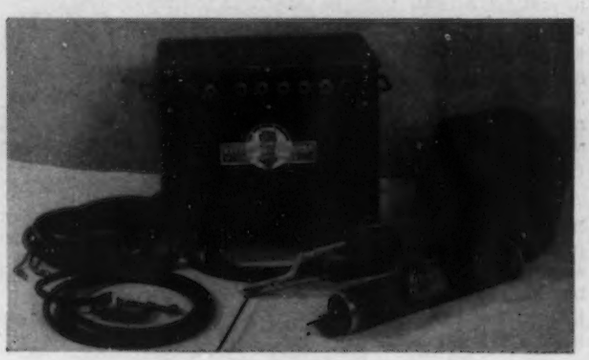


is 70 amp. at 110 volts and 35 amp. at 220 volts and is proportionately lower when welding at lower ranges. The set is designed for use with coated electrodes from 1/16 to 5/32 in. in diameter.

The welder is portable, being equipped with handles and four large hard-rubber swivel casters. The 60-cycle set weighs 112 lb. and the 50 cycle set 130 lb. Each welder is 14¼-in. high, 10¾-in. wide and 17⅞-in. long, including handles. Accessories include welding lead with holder and current adjusting plug attached, ground lead with handy C-clamp, helmet, wire brush, supply of Crucible Weld electrodes and primary lead.

Small Parts Ground to Close Limits On Production Basis

THE small-size plain grinding machine here pictured has been developed by the Brown & Sharpe Mfg. Co., Providence, for the rapid cylindrical grinding of duplicate small parts to close limits on a production basis. It is available in two capacities, 3 in. x 12 in. and 3 in. x 18 in., the shorter-table machine being recommended where the work is not over 12 in. in length and minimum floor space is important.

All operating controls and adjustments are grouped at the front of the machine, right at hand from the operating position. The recessed design of base provides ample leg-room for the operator to sit comfortably at the machine; while the convenient height of the table and controls provides for equally efficient operation from a standing position.

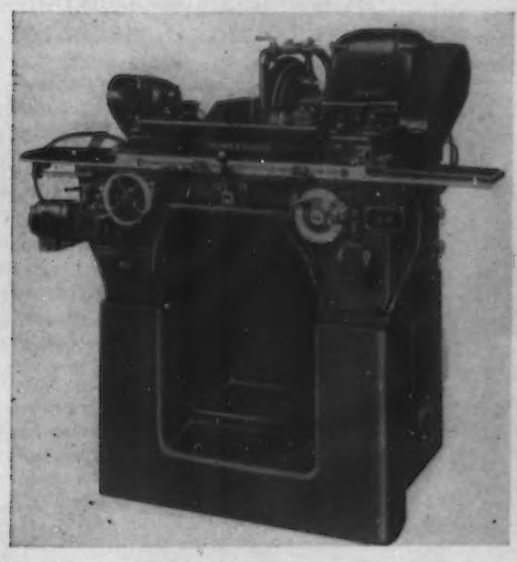
The headstock and coolant pump are started and stopped electrically by rotation of the cross feed handwheel, starting automatically when the grinding wheel is advanced toward the work and stopping when the wheel is withdrawn to unloading position. This feature, in combination with the headstock brake, aids materially in maintaining high production. A lever permits cutting out the headstock and coolant pump motors when wheel-truing or setting-up. A table tray for holding work pieces, dogs and tools, is an additional convenience.

Wheel-spindle, headstock, table and coolant pump are driven by separate motors, a push-button station at the front controlling the starting and stopping of the entire machine. All electrical control units are built into the machine; they are well protected, but accessible. An automatic oiling system lubricates the wheel-spindle bearings, the cross-feed screw and full nut, the table and cross-slide ways and the table driving mechanism of the machine. The coolant tank is integral with the bed casting, and has removable cover and baffle plates. The centrifugal motor-pump is also removable, to facilitate cleaning of the coolant tank.

Centers swing 3 31/32 in. over the table, and a 14 in. wheel clears work to 3 in. in diameter. Maximum diameter of work recommended for efficient production grinding is about 1 in. The speed of the wheel-spindle is 1776 r.p.m. and 2045 r.p.m., the latter obtained by changing a sheave. Work speeds, four in number, range from 202 to 800 r.p.m. Floor space occupied is: 12 in. machine, 42⅝ x 70¼ in.; 18 in. machine, 42⅝ x 82¼ in.

Sawing Machine Has Closer Speed Control

CLOSER control of a wider range of operating speeds is an outstanding feature of a new model DOALL contour sawing and filing machine placed on the market by Continental Machine Specialties, Inc., Minneapolis. This machine, named the Metalmaster, incorporates not only a large "job selector dial" for determining the saw speed, saw set, and saw temper suited to the kind of steel or other metal being cut, but also has a new indicating dial which shows the exact speed at which the machine is running. Thus, the operator has at hand the means for determining the most efficient speed for cutting any one of 48 different materials and also has before him



AT RIGHT

CONTOUR sawing and filing machine equipped with speed control dials, butt welder and saw weld grinder. The table is arranged for tilting, as shown.

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AT LEFT

PLAIN cylindrical grinder for production grinding of small parts to close limits. The recessed base permits the operator to sit comfortably at the machine.

the means of knowing whether the machine is operating at the selected speed.

Saw speeds are infinitely variable through a patented V-type variable-speed pulley device incorporating a V-belt transmission with interlocking variable-pitch double-groove sheaves. Speed change ratio is 16 to 1, and the range of speeds is from 50 to 800 ft. per min.

Other new features of the Metalmaster include four-way table tilt, 45 deg. back and 10 deg. laterally, and a new type of controlled power work feed. The accompanying illustration shows the table tilt feature, which permits sawing and filing at an angle to shape the die and punch simultaneously from one block of metal. The machine includes an automatic butt welder for joining the ends of saws and a grinding wheel for removing the weld flash.

Two sizes of the new machine are built, one with a 14 in. throat (the distance from the center line of cutting to the face of the column) and the other with a 30 in. throat. Both sizes are designed for work up to 8 in. thick.

Sheet Stack Transfer Conveyor Built for Southern Mill

THE Mathews Conveyer Co., Ellwood City, Pa., recently developed for a southern strip mill the 14-ft. long sheet stack transfer conveyor, shown in the accompanying illustrations. The unit is designed to receive stacks of sheets and discharge them at right angles on to a processing line conveyor. The stacks handled weigh approximately 20,000 lb. The largest individual sheet is 72 in. wide by 13 ft. long.

A heavy-duty roller conveyor line receives the stacks from an overhead crane, and the stocks move lengthwise by gravity on to two parallel roller conveyor lines mounted on the transfer mechanism. As a stack comes to rest against the bumper of the transfer, the unit is placed in operation. The two parallel lines of conveyor are lowered a distance of 4½ in., depositing the stack on eight parallel lines of roller conveyor which are set at a slight grade and carry the stack off at 90 deg. relative to the direction in which it was traveling when received. Fig. 1 shows the transfer in the "receive" position with the two parallel lines of receive conveyor up. Fig. 2 shows the unit in the discharge position, the "receive" rollers having been lowered out of the way.

When the discharge operation is accomplished, the receive conveyor is immediately raised into place ready to receive the next stack of sheets. Having been discharged from the transfer, the individual sheets are subject to end and side shearing operations and conveyed to a piling unit.

Raising and lowering of the transfer conveyor is by means of bevel gears placed at each of the four corners of the table. These gears are connected to screw shafts. A 15-hp. motor with speed reducer connection actuates the drive shafts and pinions which in turn operate the bevel gears and screw shafts, the operation of the latter raising and lowering the conveyor section.

The receive conveyor, which is the two parallel lines subject to raising and lowering, is a "stake type" roller conveyor, commonly used where sheet packs are loaded or unloaded by overhead cranes. The discharge conveyor lines incorporate short rollers mounted in heavy angle frames. The unit is of all welded, heavy construction throughout.

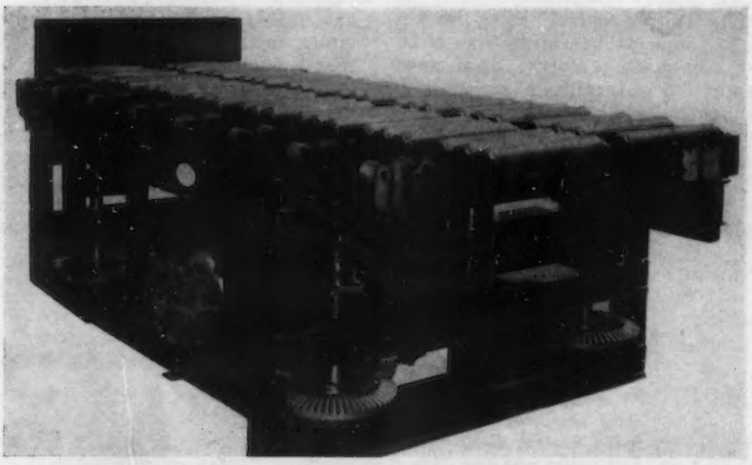
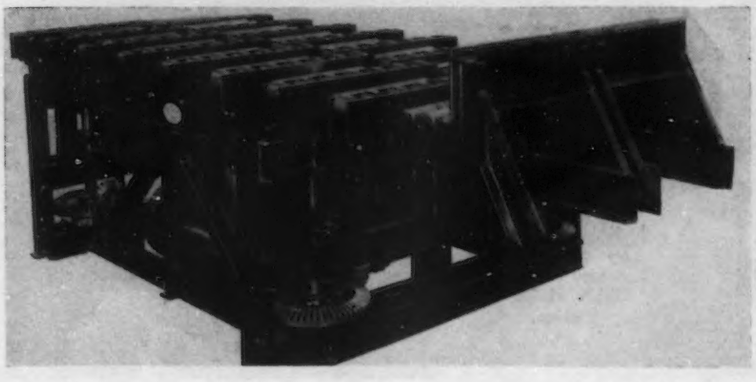


FIG. 1 (above)—Sheet stack transfer in "receive" position, with the two parallel lines of receive conveyor up.

FIG. 2 (below)—Transfer unit in the discharge position, the receive rollers having been lowered out of the way.



Alloyed Cast Irons In Refining Equipment

INTERNATIONAL NICKEL CO., 67 Wall St., New York, has issued a 20-page treatise entitled *Alloyed Cast Irons in Petroleum Refining Equipment.* This deals with the qualities of abrasion and corrosion resistance, thermal expansion, impact resistance, machineability and strength as well as temperature resistance of various irons containing nickel and other alloying elements. Illustrations are given of specific example of cast machine parts, piping, etc., used in oil refining equipment, and the alloys are described which have been found suitable for the severe conditions of heat and corrosion inherent in the refining process and associated operations. Technical data are well presented in charts and tables.

Cost Control in a Gray Iron Foundry*

IT should be unnecessary to emphasize how essential it is for the management of a foundry to have a correct costing system. If no attempt is made to know the actual cost of production, those who are responsible for the fixing of prices and for the finances of an undertaking are completely in the dark as to when the business is operating at a profit or at a loss.

At any time, a correct costing system is necessary, because unless costs are known, one cannot be certain that he is recovered in the selling price. A costing system is the only means of actually measuring any profit or loss made for a given rate of production, and of knowing what resources may become available out of income for further development. Costing also shows in what directions efficiency should be increased and waste eliminated.

A costing system should not be used simply to work out average costs for certain periods; this would be sufficient only in the exceptional case of a foundry manufacturing consistently one class of castings. In the large majority of cases, the production of a foundry comprises several types of castings of different weights, and differing also owing to the grade of the metal and the complication of the casting itself.

Where these conditions obtain, each class of casting should be costed separately; otherwise, and unknown to the management, the profit made on some classes of castings can easily be offset, partly or entirely, by a loss made on other types. If selling prices are based arbitrarily, at so much per ton, on an average cost of production, certain castings will be quoted at a price that will discourage customers, while others will be offered at such a low price as to depress the market unfairly for that class of casting. A correct costing system is, therefore, an essential requirement for the individual foundry, and provides an accurate basis for estimating and checking selling prices.

While the necessity for a correct costing system is generally recognized, the benefits to the industry as a whole of a system based on standard principles are not, perhaps, so widely appreciated. By the adoption of such a system, costs can be established on a comparable basis; differences in costs for given types of castings can then be accounted for by the particular circumstances of each foundry, due to proximity of sources of supply, transport facilities, management and efficiency. In fact, a standard cost system would be a measure of a foundry's efficiency, allowing, of course, for the material conditions under which the foundry must operate.

In working out costs over a period, every item of expenditure incurred during that period must be taken into account and absorbed in the cost; the cost figure arrived at for the production during that period will be reliable, provided that the principles governing the system are sound. When costing a given job (as, for instance, a one-ton casting) or when costing for one class of casting, it is possible that only a close approximation to the exact figure can be arrived at. It can be stated, however, that if a correct procedure be used consistently, the cost figure will be sufficiently close in each case for all practical purposes. On the other hand, it must be emphasized that if the costs arrived at by different

(CONTINUED ON PAGE 119)

RED ink or black ink on a foundryman's books varies to a great degree with the knowledge he has of actual production costs. Not general knowledge, but specific details which can properly be allocated to the various batches of castings going through the plant. The accompanying cost study which will be concluded in next week's issue, is of such a scope and deals so ably with fundamentals that both the small and large unit may gain a better knowledge of what should be considered in setting up a workable and valuable cost control system which could conceivably lead to more business, or better profits on present business. This article is reproduced through the courtesy of *Foundry Trade Journal*.

*Paper presented to the Thirty-fourth Annual Conference of the Institute of British Foundrymen, held at Derby, June 8-11.

THIS WEEK ON THE ASSEMBLY LINE

. . . Michigan Labor bill stranded when House and Senate break up session; Murphy veto meets UAW demands.

o o o

. . . Ford prices increased $15 to $35, indicating trend for 1938 prices.

o o o

. . . Production above seasonal expectations, reaching 88,403 for last week; Polk & Co. adds 10,000 to estimate for June sales.

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. . . Reo, Hupp and Willys sought for merger by Vanderlip interests.

DETROIT, Aug. 2.—Labor news in Michigan this week is featured by a series of splits that leaves nothing but uncertainty and guesswork. The Governor and Legislature split; the House and Senate are in violent disagreement, each having passed its own type of labor bill; the Senate thinks it has ended its special session; the House is attempting to carry on business. Under the surface of all these things is a split between the CIO and the AFL which have been playing "on the same team" up to now in Detroit.

The attempt to gain for the state a position of leadership in the adoption of modern labor legislation was begun last January by Governor Murphy.* During the strike periods he was busy working toward a State law that would embody his ideas on labor. He proposed an "ideal bill" this spring, but almost immediately permitted himself to be quoted as saying that it could be revamped and the UAW stepped into the picture to attempt just that. Then when everyone believed that the UAW had incorporated everything it desired and the bill was on the verge of passing, there was a sudden change of mind and the UAW began a campaign to defeat the measure. AFL leaders were signally silent.

At its final passage the bill was looked upon as a compromise that offered a little good to labor and a little, too, for industry. Picketing provisions were strict, prohibiting, as they did, any attempt to block highways or entrances to plants and prohibiting the importation of pickets. The bill did, for the first time in Michigan, make it legal to picket and restricted courts in injunction proceedings. Apparently pressure from the CIO and the AFL was responsible for Murphy's veto. He then called a special session of the Legislature for Friday noon, at which he urged it to pass a revision of the bill. In a stormy session that lasted into the night, the House passed Murphy's version of the bill and the Senate passed an exact duplicate of the act vetoed earlier by Murphy. Changes at stake in the special session included:

The proposed Board of Industrial Relations could designate a craft union as a collective bargaining unit. This provision would, of course, be recognition of the AFL. Here is where the two unions locked horns.

The picketing provision was liberalized to the extent that all members of the labor organization involved in a dispute could picket, as long as they were residents of the same community or one adjacent. The old measure restricted picketing to employees of the plant.

Legalization of the closed shop.

As things stand at present, the Senators are leaving for home, considering their session over and the House has agreed to continue in session three days, until Wednesday. The Governor, meanwhile, spent the weekend at Washington as a guest of President Roosevelt to discuss the labor problem and labor legislation. Incidentally, the break between the Detroit AFL group and the CIO has finally come into the open with an attack by the AFL on the membership stealing tactics of the CIO. In a front

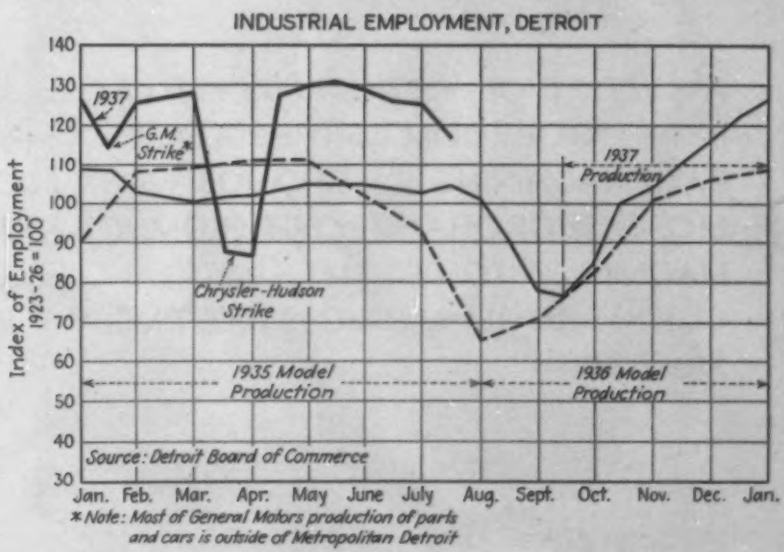
page editorial, the Detroit Labor *News*, directed by Frank X. Martel, accuses the CIO of issuing a charter for the "thugs, strike-breakers, poison gas users" in a local baking company. The inter-union battle is made worse by the fact that the UAW is attempting to set up new counter-organizations among milk wagon drivers, bus drivers of the municipally owned transportation system and employees of the Public Lighting Commission.

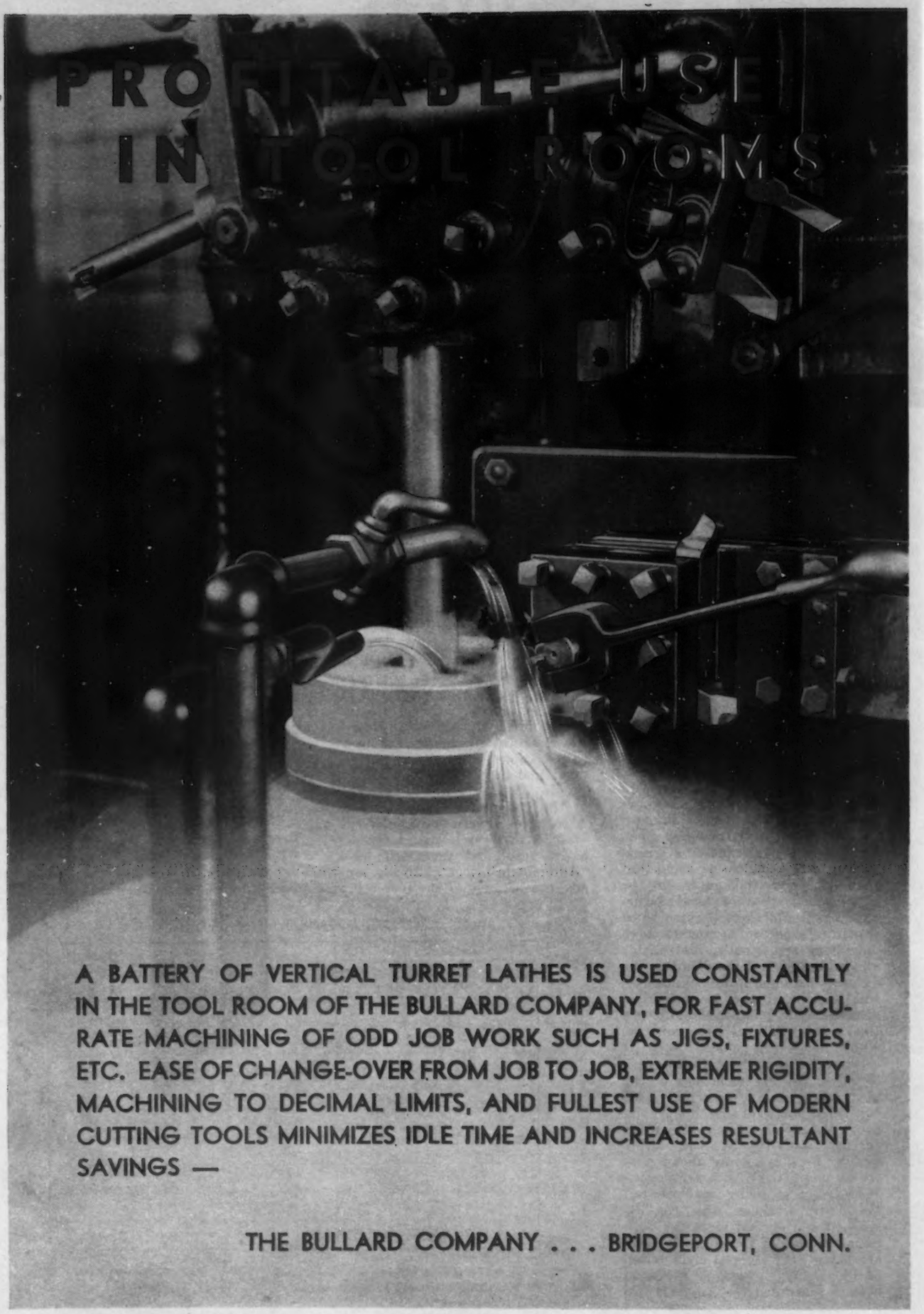
The National Labor Relations Board finally has wound up its hearing of charges made by the UAW against the Ford Motor Co. Ford attorneys at a later date will present more evidence to show that Harry Bennett, personnel director, was not present at the fight scene on May 26. The one-man grand jury investigating the fighting that took place at the gates of the Rouge plant recommended Saturday the disciplining or removal of a police inspector, sergeant, three patrolmen and a police matron for alleged neglect of duty during the fighting. Judge Ralph W. Liddy, who conducted the investigation, directed his recommendation to the Dearborn Safety Commission, which heads the police force. It is charged that the officers neglected to prevent violations of the law, made unlawful arrests and permitted unlawful search and seizure. Meanwhile, preparations for further activity by the UAW against Ford are going ahead. Distribution of UAW literature each Wednesday is being made to all the Ford workers who can be reached and special meetings with racial groups of the Ford workers are being held. Special distribution of the UAW newspaper in Dearborn is scheduled for Aug. 11, two days after the plant reopens. In addition, a special edition of Upton Sinclair's novel, "The Flivver King," is to be distributed at 25c. a copy.

General Motors negotiations still are being carried on to settle the subject of union responsibility, but no real progress has been reported by either side.

In line with previous predictions, the Ford Motor Co. has announced price increases ranging from $15 to $35 on several models of its 1937 line. The increases, according to the Ford announcement, are necessary because of the rising costs of labor and new materials. According to Alvan Macauley, president of the Automobile Manufacturers' Association, there will be a substantial increase in prices for 1938 as a result of increased costs. "Automobile prices naturally must advance because of the increase of overhead, including wages; that alone will have an annual aggregate of $100,000,000," Macauley says. He predicts also a substantial falling-off in production in the later months of the next model year after initial demand is met, as a result of the higher prices. It is worth noting that several months ago Chevrolet managed an effective increase in prices by the addition of accessory groups. Approximately $30 worth of equipment (retail price) is put on each new car at the factory over and above such standard items as bumper and spare tire. Because of the delivery situation, customers have been taking the cars as received and paying the extras.

Buick reports July as one of the four best months of the year and, with the sales volume it has been experiencing, it is one of the General Motors divisions that will





A BATTERY OF VERTICAL TURRET LATHES IS USED CONSTANTLY IN THE TOOL ROOM OF THE BULLARD COMPANY, FOR FAST ACCURATE MACHINING OF ODD JOB WORK SUCH AS JIGS, FIXTURES, ETC. EASE OF CHANGE-OVER FROM JOB TO JOB, EXTREME RIGIDITY, MACHINING TO DECIMAL LIMITS, AND FULLEST USE OF MODERN CUTTING TOOLS MINIMIZES IDLE TIME AND INCREASES RESULTANT SAVINGS —

THE BULLARD COMPANY . . . BRIDGEPORT, CONN.

have difficulty in cleaning up on its orders so that it can change over for 1938 production. Based on its deliveries in the first 20 days of the month, it is probable that July will show more than 18,000 Buicks sold. This is a gain of nearly 40 per cent over 1936 July volume. General Motors production during the last week held up remarkably well, totaling 48,892 units, compared with 50,232 in the preceding week. Chrysler volume is reported unchanged at approximately 26,550 units. Ford, with only Lincoln producing during the vacation and inventory period, turned out 660 cars compared with 655 last week. The total week's output, according to Ward's Automotive Reports, is 86,403, compared with 88,055 last week and 97,755 a year ago. Ford was operating last year during this period. The latest R. L. Polk & Co. figures on registrations show that earlier estimates for June were too conservative. Figures now released are 345,000 passenger cars, an increase of 10,000, and 60,000 trucks. Along with its automotive production figures Ward's service has analyzed income statements for the second quarter of the automotive industry and concludes that the car manufacturers have suffered a 16 per cent decline in profits, while accessory companies have averaged a 4 per cent gain.

It is understood in Detroit that the Vanderlip interests, now represented on the Reo board of directors, have initiated a proposal for merging three of the independent manufacturing companies with Reo, Hupp and Willys named as the prospective units. All three companies have recently undergone reorganization. Hupp, by the way, has just awarded contracts for parts and equipment on its 1938 series of sixes and eights, some of which are now being built for export. With domestic production scheduled to start in September, the following are among the important suppliers: Spicer Mfg. Co., axles and propeller shafts; Carter Carburetor, carburetors; Spring Perch, springs; Warner Gear, transmissions and overdrives; Budd Wheel, wheels; Gemmer Mfg. Co., steering gears; Midland Steel, frames; C. M. Hall, lamps; General Spring Bumper, bumpers; Perfection Industries, instrument panels; Motor Products, window ventilators; Scheller Mfg. Co., steering wheels; American Forging, tubular seat frames; D. L. Auld, hub caps.

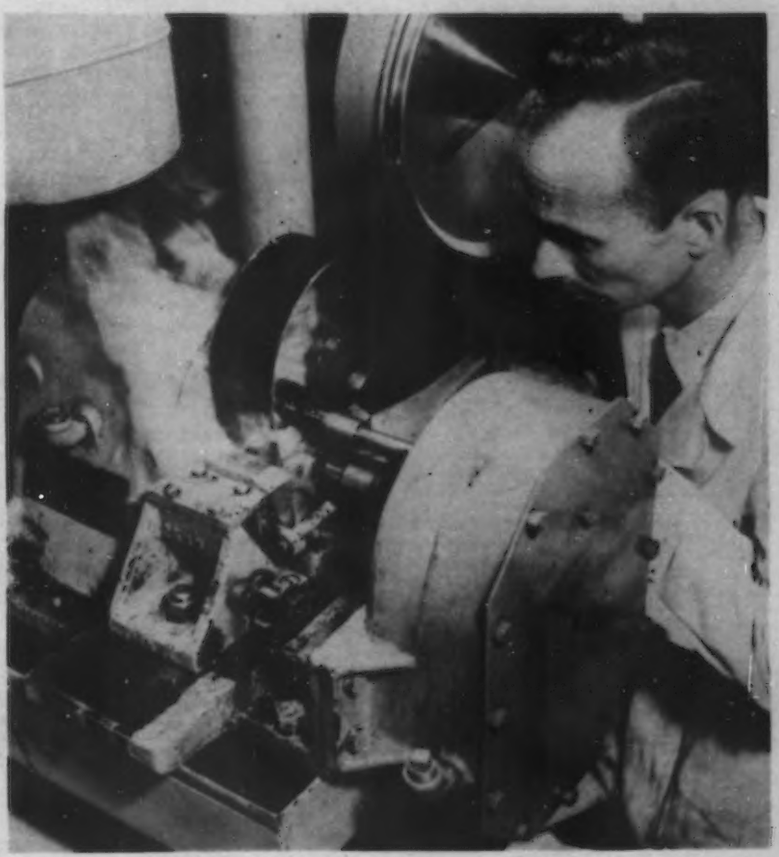
At the same time the American Bantam Car Co., Butler, Pa., is to be supplied by the following: Hayes Body Corp., Grand Rapids, Mich., steel body stampings; Transue-Williams Steel Forging Co., Alliance, Ohio, forgings; Spicer Mfg. Co., Toledo, axles; Motor Wheel Corp., Lansing, Mich., wheels; Detroit Body Die Co., Detroit, fender dies; Rockford Drilling Machine Co., Rockford, Ill., clutches; Firestone Tire & Rubber Co., Akron, Ohio, tires; Morrison Steel Products, Inc., Buffalo, steel stampings; Marquette Metal Products, Cleveland, screw machine products; Murray-Ohio Mfg. Co., Cleveland, steel stampings; National Bronze & Aluminum Co., Cleveland, aluminum castings; Western Automatic Machine Screw Co., Elyria, Ohio, screw machine products; Electric Auto-Lite Co., Toledo, electrical equipment; Jackson Motor Shaft Co., Jackson, Mich., machine work.

With Packard well along on its change-over for new models, it has been learned that a form of independent suspension of the rear wheels will be one of the outstanding new features. Another car which will feature this same thing is Buick. These two cars, already highly competitive, apparently are due to have a merry time of it in 1938. In the case of Buick, at least, the suspension will make use of coil springs.

Possibly there will be no official announcement of the opening of the new proving ground of the Ford Motor Co., which is under construction at the 600-acre Ford airport. On Henry Ford's 74th birthday last week, he took a speedy trip around the three mile concrete test course and made the comment, "We'll make this the official opening of the proving ground."

Expansion programs still continue. Bopp Steel Corp., Detroit, is putting up a building addition to increase its shipping and receiving facilities and is adding a new annealing furnace.

BREAKDOWN tests on lubricants are typical of the activities of automotive laboratories. Research on fuels and lubricants is by no means left to the petroleum industry alone. Special lubricants such as those used in modern hypoid rear axle gears have been undergoing development on this machine used by General Motors research laboratories. Two steel bearing races mounted on separate spindles in this machine are brought together under a constantly increasing pressure with an extremely thin film of lubricant between them. Since the spindles are operated at different speeds, there is slippage and friction between the races. The lubricant is literally squeezed to death and actually breaks down under the pressure. In this picture smoke is being drawn off the suction pipe at the left. The breakdown pressure is shown by the dial near the operator's head.



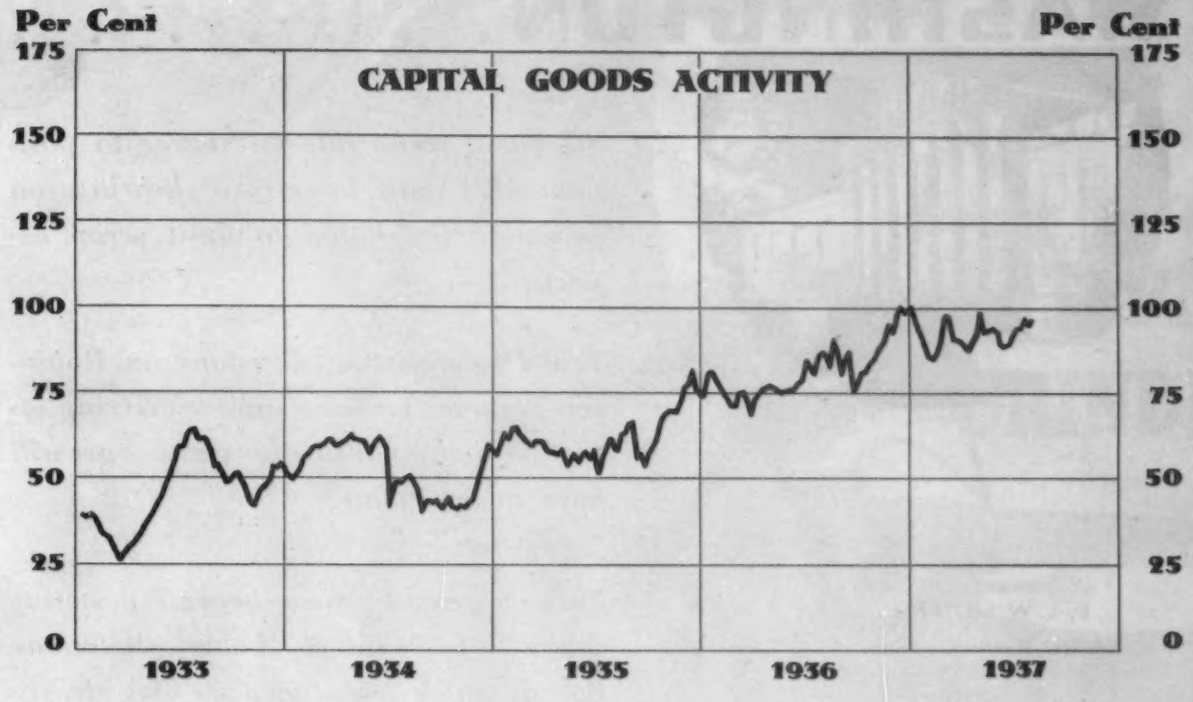
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week

	June 1937	May 1937	June 1936	Six Months 1936	Six Months 1937
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,639,733	‡5,339,925	3,763,289	19,612,326	29,373,959
Coke production (net tons)[b]	.....	4,798,511	3,787,711	21,295,300	.....
Pig iron:					
Pig iron output—monthly (gross tons)[c]	3,107,506	3,537,231	2,586,240	13,528,226	19,706,593
Pig iron output—daily (gross tons)[c]	103,584	114,104	86,208	74,331	108,876
Castings:					
Malleable castings—production (net tons)[d]	54,026	55,960	43,766	274,092	351,855
Malleable castings—orders (net tons)[d]	43,141	‡46,018	42,848	265,055	334,858
Steel castings—production (net tons)[d]	.....	95,995	70,323	341,582	.....
Steel castings—orders (net tons)[d]	.....	68,688	94,345	423,544	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,183,762	5,135,559	3,984,845	21,326,335	28,764,633
Steel ingot production—weekly average (gross tons)[e]	875,236	1,163,332	926,706	817,997	1,111,891
Steel ingot production—per cent of capacity[e]	74.46	88.82	70.75	62.45	84.89
Finished steel:					
Trackwork shipments (net tons)[e]	9,194	8,807	6,507	34,592	54,008
Fabricated shape orders (net tons)[g]	169,792	‡121,481	‡132,387	‡761,976	909,313
Fabricated shape shipments (net tons)[g]	140,125	‡137,683	‡154,470	‡692,244	769,560
Fabricated plate orders (net tons)[d]	34,833	28,913	52,937	231,407	251,245
U. S. Steel Corp. shipments (tons)[h]	1,268,550	1,304,039	886,065	5,031,350	7,614,274
Ohio River steel shipments (net tons)[i]	147,100	102,200	109,455	465,621	657,690
Fabricated Products:					
Automobile production, U. S. and Canada[k]	521,139	540,357	470,887	2,596,356	2,917,420
Construction contracts, 37 Eastern States[l]	$318,137,100	$244,112,800	$233,054,600	$1,237,731,000	$1,494,514,300
Steel barrel shipments (number)[d]	929,536	786,607	708,069	3,902,716	5,326,327
Steel furniture shipments (dollars)[d]	.....	2,302,350	$1,470,195	$9,211,418	13,710,186
Steel boiler orders (sq. ft.)[d]	2,183,481	1,005,591	1,130,886	‡4,650,605	5,453,309
Locomotive orders (number)[m]	22	14	24	122	228
Freight car orders (number)[m]	528	3,903	4,320	26,554	45,090
Machine tool index[n]	191.8	208.5	128.8	†124.5	†227.6
Foundry equipment index[o]	228.2	237.6	141.4	†146.9	†226.1
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	49,050	59,910	319,145	.....
Imports of pig iron (gross tons)[p]	.....	6,361	16,793	97,507	.....
Imports of all rolled steel (gross tons)[p]	.....	29,031	15,715	123,768	.....
Total iron and steel exports (gross tons)[p]	.....	1,043,489	294,951	1,631,591	.....
Exports of all rolled steel (gross tons)[p]	.....	279,699	100,303	533,490	.....
Exports of finished steel (gross tons)[p]	.....	164,192	89,287	487,314	.....
Exports of scrap (gross tons)[p]	.....	630,671	186,696	1,050,273	.....
British production:					
British pig iron production (gross tons)[r]	699,300	696,300	644,100	3,749,100	4,011,000
British steel ingot production (gross tons)[r]	1,106,400	1,047,300	965,900	5,744,200	6,338,400
Non-ferrous Metals:					
Lead production (net tons)[s]	40,156	‡42,605	38,818	224,015	254,134
Lead shipments (net tons)[s]	42,710	55,212	37,736	215,737	312,640
Zinc production (net tons)[t]	50,526	55,012	44,947	253,732	280,590
Zinc shipments (net tons)[t]	50,219	55,201	41,654	252,487	319,464
Deliveries of tin (gross tons)[v]	6,645	6,425	7,795	37,020	44,435
Copper production, refined (net tons)[w]	86,016	95,265	60,562	356,180	487,465

* Preliminary. † Three months' average. ‡ Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange; [w] Copper Institute.



The Iron Age Weekly Index of Capital Goods Activity

(1925-27 = 100)

Last week	96.4	Same week 1934	50.2
Preceding week	95.3	Same week 1933	60.6
Same week last month	94.1	Same week 1932	33.7
Same week 1936	87.2	Same week 1931	61.1
Same week 1935	60.6	Same week 1930	83.8
Same week 1929	125.7		

ACTIVITY in the production and distribution of durable goods showed a gain of 1.1 points for the week ended July 31, according to THE IRON AGE seasonally adjusted index. The gain represents that the declines taking place are at a lesser rate than the normal seasonal trend, and where rises in the factors are recorded they are accentuated in the adjusted figure. A gain of three points in ingot output, for example, becomes a four-point gain when adjusted. Heavy engineering construction dollar volume rose substantially, but the gain was small on the 13-week moving average used in the composite. A loss in automobile production became a three-point gain when seasonal trends are accounted for, indicating that operations are actually above normal, allowing for the fact that Ford Motor Co. has been out of production for the last three weeks.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	85.0	+3.0
Automobile production (number of cars and trucks)	86,403	—1,652
Railroad loadings of forest products (number of cars)	41,899	—188
Pittsburgh industrial production and shipments (index number)	105.9	—2.4
Construction contracts awarded (total value)	$47,393,000	+$16,698,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . Steel and scrap interests agree to postponement until January of hearings on proposed legislation to limit scrap exports.

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. . . Trade Commission decisions on Robinson-Patman Act have some clarifying effect but leave confusing issues court will have to determine.

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. . . Former friends have become bitterest critics of National Labor Relations Board, which has shown its bias clearly in recent hearings.

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By L. W. MOFFETT
Resident Washington Editor
The Iron Age

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WASHINGTON, Aug. 3.—Hope for action this session on pending scrap legislation was abandoned by Congressional sponsors of the measure on Thursday after spokesmen for the scrap interests and the independent steel and iron producers agreed at a conference that it would take at least two months to gather necessary data for their respective cases.

Following the conference, the Military Affairs Committee voted to postpone hearings until Congress reconvenes in January. Interested parties will be given until that time to prepare their material for the committee. The view is held by some Senators that in the meantime scrap dealers and melters may cooperate among themselves and settle their differences without the necessity of any legislation.

Congressional sponsors of the pending scrap licensing bills turned out en masse at the hearing, anticipating at least some fireworks but instead heard Louis J. Brann, former Governor of Maine, representing the Independent Steel and Iron Producers Committee, and Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, ask for more time to compile the information they consider necessary to bring before the committee.

The session lasted less than two hours, and not a word was uttered in opposition to the pending bills. Most of the time was taken up by preliminary statements by Senators Schwellenbach, Bridges, Berry, Thomas, and Schwartz, all members of the Senate Military Affairs sub-committee named to handle the Schwellenbach-Kopplemann measure; Senator Nye, a member of the Military Affairs Committee; and Representative Kopplemann, House sponsor of the bill.

An "Encouragement to War"

Bridges, characterizing present scrap shipments to foreign countries as "nothing more than an encouragement to war," said that present information on the scrap situation is too inadequate to form an "intelligent background" for such legislation. He urged the committee to report favorably on his resolution which provides for a "complete investigation" by a joint Congressional committee covering iron ore resources as well as supplies of iron and steel scrap.

Sitting at a press table nearby was Senator George L. Berry, joint sponsor of the Bridges resolution, who agreed with Bridges and rushed off to another hearing.

Senator Thomas, Democrat, of Utah, who conducted the session as chairman of the sub-committee, appeared perplexed after learning from Schwellenbach that his bill had been introduced in order to find out more about the scrap export situation and its effect on foundries in the State of Washington and after hearing Representative Kopplemann tell the committee his primary purpose was to prevent this country from aiding foreign nations in preparing for war.

Thomas, who described efforts at maintaining world peace as "quite

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aside from the economic question" involved, asked Kopplemann why oil and other necessities of war should not be included in any bill designed to prevent the United States in assisting foreign countries in building up armaments.

"We've got to start somewhere," was Kopplemann's answer.

He also referred to his latest bill, which would regulate the exportation of pig iron, iron ore and finished steel in addition to iron and steel scrap and described his efforts as "actually doing something" to aid peace "instead of depending on lip service."

Brann, florid-faced former Governor of Maine, in response to questioning, told the committee his organization consisted of over 1000 members, including small independent steel producers and a large number of foundries and had been organized for only five months as a direct outgrowth of the introduction of bills to curb scrap exports. He said he thought it "substantially true" that this is the only country which does not have restrictions against scrap shipments.

Because of the range of the investigation, Brann testified, it would be extremely difficult for his group to proceed further. He asked for an extension of time which he said was imperative for the collection of the necessary data.

Benjamin Schwartz, youthful appearing director general of the scrap institute, adjusted his pincenez, and expressed a similar request.

"Your committee," he said, "hasn't all the facts and our members have some additional facts to give you." But more time is needed to get the information together, he added.

Thomas suggested the conference which followed.

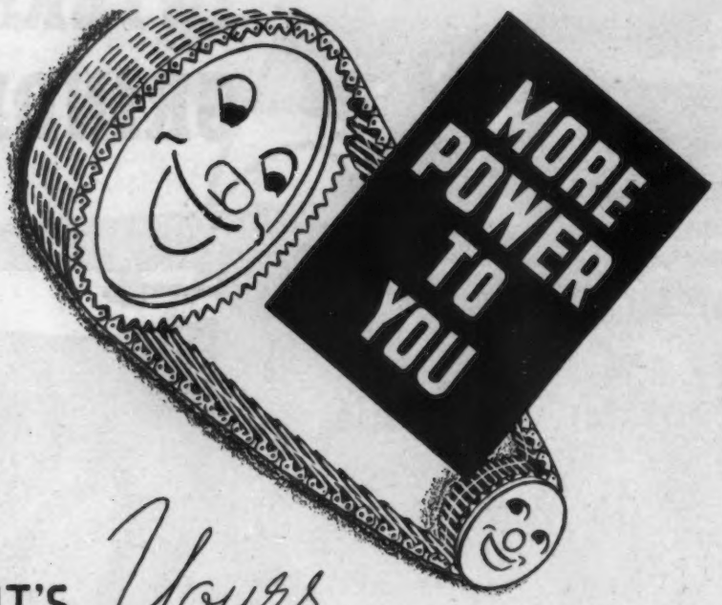
Some observers saw in the hearing the possibility that the more extensive investigation called for in the Bridges-Berry resolution might be favorably acted upon next session. They pointed out that Thomas appeared convinced following Thursday's hearing that the problem was too bulky for a cursory investigation by his subcommittee.

Others expressed the opinion that even after a favorable report as a result of an extensive investigation, the objections voiced by Secretary of State Hull and his Inter-departmental Committee against a scrap embargo could still be a powerful factor in blocking the legislation. They see little reason to believe the Hull objections would be any less effective at the next session of Congress unless, of course, unforeseen circumstances developed to change his attitude. Otherwise they see little hope for the legislation.

Bridges' inclusion of iron ore resources under his proposed investigation is based, the New Hampshire Senator explained, on the assumption that every ton of scrap kept in this country replaces two and one quarter tons of iron ore in the manfacture of steel. "This effects a conservation of these irreplaceable mineral resources," he said, adding that our national reserves of the better grades of iron ore have been estimated as adequate for a little more than 20 years.

Robinson-Patman Decisions

RECENT Federal Trade Commission decisions in four Robinson-Patman Act cases are viewed by students of this new law as leaving unsettled policies which might have been established and will have to be fixed sooner or later. In dismissing the price discrimination



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case against Bird & Son, Inc., Bird Floor Covering Sales Co., and Montgomery Ward & Co., Inc., the FTC found justified the difference in cost of selling to Montgomery Ward and to smaller buyers. Apparently there was good reason for the finding. But the FTC did not say on what basis it allocated costs. Hence it is not known what the FTC regards as the necessary and proper element of selling costs. It is considered necessary that the FTC will have to determine the methods of apportioning selling costs if the act is to be administered satisfactorily because the act itself does not establish any such method. The impression is given that the FTC did not go into this case as deeply as it might have done because four months after the law was passed the Bird Floor Sales Corp. discontinued the price policy it had applied to Montgomery Ward & Co.

In the Kraft Cheese case, also dismissed, the FTC carefully argued that price preference which was given to volume buyers was not sufficiently large to have any effect upon competition. Because of this there was no violation. With this finding, of course, dismissal followed. But the interesting point centers around Sec. 2(b) of the act which provides that where a discrimination is shown the burden of proof shall rest upon the respondent to justify. However, the FTC did not make clear whether the Kraft-Phenix Corp. was called upon to do this or not. Placing the burden of proof on the respondent is something new in American law, based as it is on the English common law principle that the accused is innocent unless proven guilty. So it would have been especially informing if the FTC had given enlightenment on this point. The commission's memo seems to show that the commission itself assumed the burden of proof and argued that it could not be sustained. From the point of view of Sec. 2(b) this seems like putting the cart before the horse. The question arises as to whether this was because the FTC had a weak case which did not wash out so that it might make its primary test of the law on a strong set of facts. The test will have to be made ultimately. The commission held that it had jurisdiction over the pricing policies of the company and many legal students have agreed with this contention. They point out that the act provides for only that control over intrastate commerce as is necessary to make the regulation of interstate commerce effective. The same principle, it is explained, was applied in the Interstate Commerce Commission Act and has been sustained by the Supreme Court.

In the case against the Biddle Purchasing Co., a cease and desist order was issued. The company is an agent for buyers, not sellers, and took commissions which it was charged reached the buyers and in effect were actually paid by the seller to the buyer. This, the FTC said, resulted in giving the buyer a discount in price. In order to be a legitimate broker, it was contended, the party rendering service and getting commissions must render a service in connection with the sale of goods to the party for whom he acts. Test of the case is assured inasmuch as the Biddle company has announced it intends to file an immediate appeal from the FTC's order. The case likely will reach the Supreme Court but first it will go to the United Circuit Court of Appeals.

The Biddle company maintains that the commission's decision can have no retroactive effect on the

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company's business. Some other food interests, however, think that the FTC order will be effective until it is set aside by the court—if it is set aside—in which case appeal would be taken by the Government.

In the Hollywood Hat Co. case, a cease and desist order was issued on the ground that, unlike the Bird-Ward case, the discounts allowed

FORMER Governor Brann of Maine (above), who represents the Independent Steel and Iron Producers' Committee, and Benjamin Schwartz (right), director general of the Institute of Scrap Iron and Steel, faced each other in a Senate hearing and agreed to a postponement until January of hearings on legislation proposing to limit scrap exports. Both sides said it would take more time to present their case properly.

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the largest customer were not justified by the difference in cost of manufacture, saye or delivery. The difference in price, it was contended, might have the effect of injuring or destroying competitors who were denied the benefit of the discriminatory price.

Some Clarifying Effects

Though leaving some fundamental policies undetermined, the decisions do have clarifying effects—at least until court tests are made. Interestingly enough the first case which probably will get into the courts, that of the Biddle company, was decided adversely to the interests in whose behalf the act was passed. It strikes at the small retailer who benefited from volume buying, cooperatives, and voluntary chain groups, a fact that the FTC no doubt recognized, yet unescapable under interpretation of the law as the FTC saw it.

The Bird-Ward dismissal order definitely upheld the principle of price discrimination based on the difference in cost of selling to a large and a small buyer even if the exact method of allocating costs was not made known. In any event the economics reflected in cheaper production of large quantities than in small quantities were not pushed aside and the smaller buyer is just where he was within an undetermined differential area which may become more definitely fixed by subsequent tests of the law. In the Hollywood Hat case, the cease and desist order found the price differential, averaging approximately 15 per cent, as partially due to the lowering of the quality of the product, so that no clear-cut policy on price discrimination resulted. It is understood this decision will not be appealed.

The decisions affirm the right of a seller to select his own customers so long as he does not unduly discriminate between them; justify quantity discounts which have only a remote effect on the income of competing buyers; approve as reasonable competition discounts which develop orders sufficient in volume to provide regular delivery system and legalize such quantity discounts when like discounts are maintained in the industry and selling prices generally are greater than those of competitors.

Friends of Labor Attack NLRB

NOT the money changers, economic royalists, Tories, or forces of entrenched greed, but its former friends, have become the most bitter critics of the National Labor Relations Board. Joining them are those who, if not classed as admirers, certainly could not be classed as unfriendly. So-called liberal papers hitherto friendly have directed pointed editorial attack on the board. Senator Nye, big business baiter and crusader for the oppressed worker; General Hugh S. Johnson, former keeper of the more or less sacred Blue Eagle; Representative John E. Rankin, consistent New Dealer, and others who have followed the New Deal sawdust trail have joined the growing list of those who are tilting sharp lances at the board. And it is reported that from high circles within the Administration the tactics of the board have been assailed. Coming from these sources, the board itself cannot dismiss with contempt the accusations of being strongly prejudiced against employers and a mere adjunct of the CIO. The CIO partiality is so obvious that AFL officials have criticized the board strongly and with good reason.

The present board, of course, ought to be turned out of office, as suggested by Representative Rankin. It has no standing whatsoever as a semi-judicial body. Unfortunately, however, with CIO backing, it is not likely the board will be replaced—unless a real break between the CIO and the New Deal occurs.

The board never showed its bias to a greater degree than at the recent Republic hearing, presided over by Edwin S. Smith, who acted as chairman in the absence of J. Warren Madden. Edwin S. and Donald Wakefield Smith, reveling in their brief authority, were perfect small-time martinets in cracking down on Republic counsel. On the other hand they not only gave CIO Counsel Lee Pressman carte blanche privileges of procedure, but permitted him to sit at the same table with NLRB attorneys and even by questions they asked, the Smith tandem gave leads to Pressman to aid him in developing testimony sought to be damaging to Republic. The proceeding was

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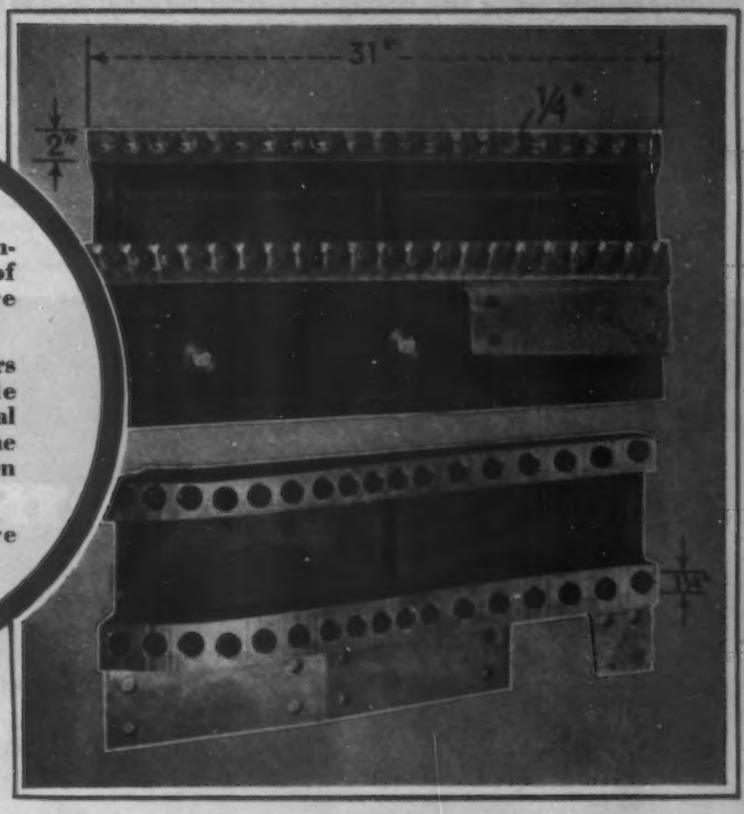

These Castings demonstrate the practicability of Meehanite for pressure work.

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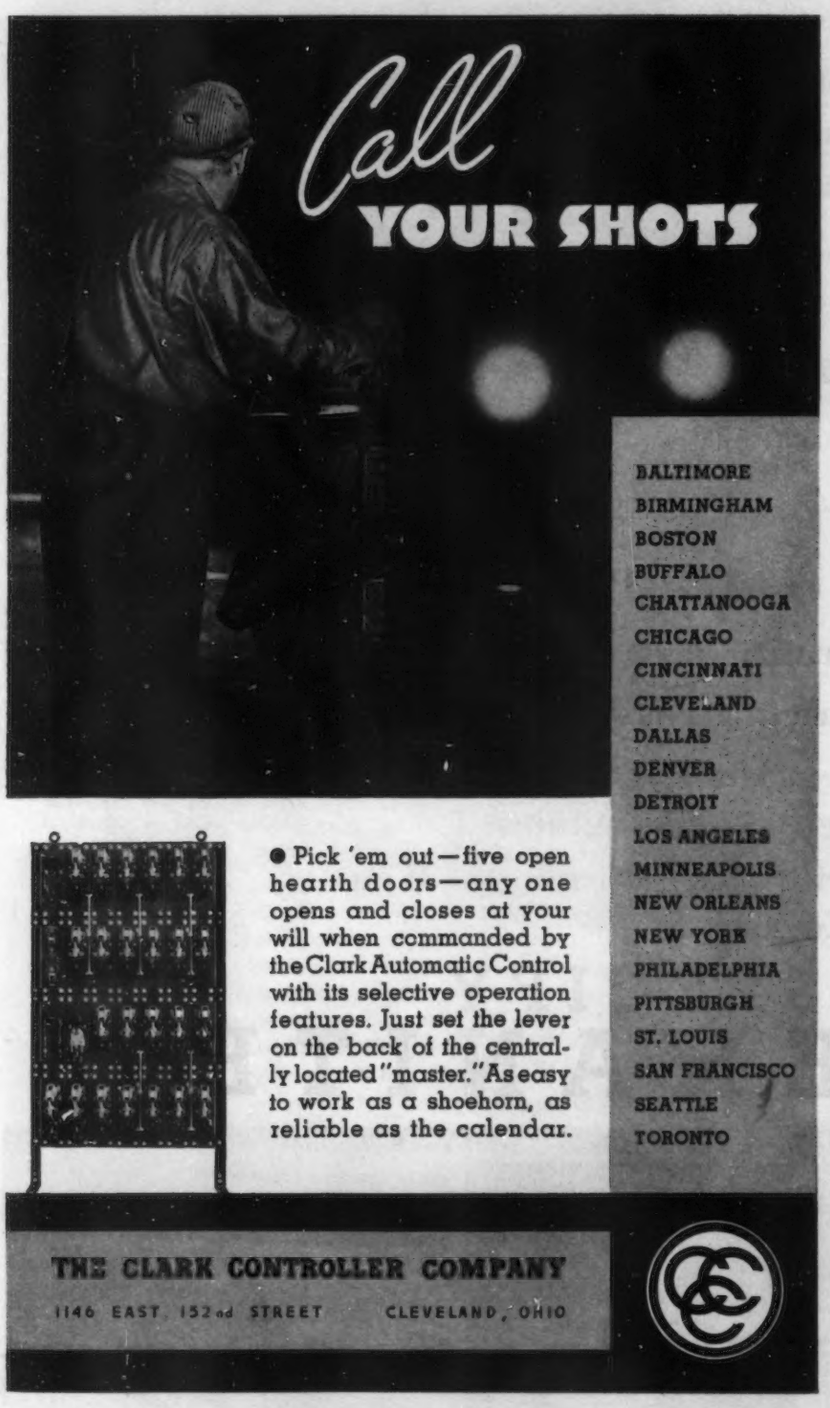
such a farce — and it differed only in small degree from the typical board proceeding — that lawyers are either laughing about it or condemning it as having been intolerable.

The cheap excuse is offered by friends of the board that it is its duty under the Wagner Act to investigate as well as to pass judgment. The answer is the board does neither. It persecutes and condemns in advance. The statement that the board's proceeding was upheld by the Supreme Court in the Jones & Laughlin decision validating the Wagner Act is, of course, ridiculous also. The court certainly did not attempt to justify high-handed procedure. On the contrary, it pointed out that the act establishes standards to which the board must conform. For one thing it must receive evidence. Complaint is made that it often arbitrarily refuses to receive employer evidence. The Supreme Court likewise referred to protection afforded by the act against arbitrary action by the board, referring to the fact that the board's orders are subject to court review.

"We construe the procedural provisions as affording adequate opportunity to secure judicial protection against arbitrary action in accordance with the well-settled rules applicable to administrative agencies set up by Congress to aid in the enforcement of valid legislation," said the court.

This is the bright spot that shines out against the board's tactics. And it is another reason for preserving the Supreme Court against any packing scheme.



British Restricting Exports of Munitions

LONDON (*Special Correspondence*).—Measures to tighten up the restrictions on the export of arms from Britain have been published in the official London *Gazette*.

The existing open general export license is revoked as from Aug. 9 and replaced by a new form of license, under which exporters must prove to the customs authorities that the goods are delivered at the destination to which the license applies. The new license, which may be revoked at any time by the Board of Trade, does not cover exports of military planes or equipment.

A number of countries are excluded from the list to which the new license applies, including Spain, the Spanish possessions, the Spanish zone of Morocco, Abyssinia and parts of Africa and the Arabian peninsula.

It is stated by the Board of Trade that the change followed a recommendation of the recent Arms Commission. It means that in future specific licenses will have to be obtained for the export of arms or aircraft.

Nordberg Mfg. Co., Milwaukee, manufacturer of heavy machinery, has reopened its nonferrous foundry plant on a production basis after a lapse of about 10 years, during which time it purchased its needs of brass and bronze bearings and other similar products. The brass foundry has been completely re-equipped, including furnaces, electric crane, etc., and is employing 25 men, which number will be increased to about 40 within a short time.

CIO Interference with Mails Assailed in Minority Senate Report

WASHINGTON, Aug. 3.—Filing a minority report of the Committee on Post Offices and Post Roads last week on the Bridges resolution to investigate interference with mail deliveries by CIO pickets at Republic Steel Corp. Ohio plants, Senator Bailey, Democrat of North Carolina, sharply assailed the Post Office Department for its failure to deliver the mail.

"This might have required calling out of the army, but if this were necessary, the army itself should have been called out in order that the mail might be carried," said the report. "If it be said that such a course might have caused bloodshed, the answer is that any other course is likely to cause much more bloodshed."

The Senator, in urging that the army should have been called out if that were necessary to insure safe delivery of the mails, based his view on the contention that a Government must function notwithstanding men in violation of the law make it dangerous to do so.

Also running directly counter to the majority report and to a report of the La Follette Civil Liberties Committee, Senator Bailey agreed with the Chicago coroner's jury that the deaths of rioters on Memorial Day at the South Chicago plant of the Republic company were justifiable homicide. The police, he pointed out, were dealing with an armed mob proceeding to a plant where peaceful men were at work. The police, he said, warned the mob as required by law. Stating that the mob would not yield but continued in an attitude of menace, the Senator said the mob invited and became responsible for consequences. Senator Bailey also questioned the policy of Congressional investigations in matters of this character.

Discussing interference with the mails, the report said:

"Suppose the example set here by the Post Office Department should be followed. Of what function of the Government would we be assured?

"A government can afford to weaken before a mob no more than it can afford to weaken before a highwayman.

Says Post Office Should Have Jailed Offenders

"The proper course for the Post Office Department was to have had warrants sworn out for the known offenders and have them brought at once before a United States commissioner and placed in jail or placed under bond pending trial, and if this procedure failed, then it was the clear duty of the Post Office Department to call upon the President of the United States to exert such force as was necessary to overcome the violent interference with the functioning of the Government. The evidence shows it delayed action two weeks, having in the meantime agreed to withhold lawful mail which the picketers objected to. The action in refusing to take the mail, taken under circumstances of duress, was calculated to encourage others to demand that the Government proceed with its functions according to the will of private citizens

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Swage 1/64" to ¼" in the No. 30 and No. 70 Series Etna Swaging Machines. These machines are as carefully designed and built as the larger sizes. No. 30 Series, handling up to 3/16", has Timken roller bearings and 1" die length. No. 70 Series, shown above, handles up to ¼", has Timken Roller Bearings and 2" die length. Alloy steel spindles, hammer rolls and inner rings are hardened and ground to give extra long life. Die-holding plate on front end of spindle permits swaging very short lengths easily. Write for Catalog on Series No. 30 and No. 70.

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rather than according to law. The strike leaders first made it unsafe to carry the mail, then stipulated what mail might be carried.

"I have little patience with the effort to make a distinction between normal mail and abnormal mail; but, if made, it must be made freely by the authorities and not under duress. An American citizen has a right under the law to transmit mailable matter through the post office upon the payment of the postage required by law. A citizen pays his taxes, renders his general service as a citizen, in order that he may receive the benefits of the Government; and the carrying of the mails is a monopoly enjoyed by the Government for the benefit of its citizens. It is a benefit to which they are entitled as a matter of right."

At another point the report said: "I hope that the Post Office Department will never again undertake to excuse itself before the Congress by the plea that lawless men had made it unsafe to carry the mails. On the other hand, I hope that hereafter when lawless men or highwaymen or picketers or others interfere with the mails, instant action will be the rule and all the power necessary will be invoked in due season.

Says CIO Must Respect Law

"I may say that the evidence showed that the men who were interfering with the mails and making it unsafe for the Post Office officials to carry them were representatives of a labor organization known as the CIO. If this organization is to invoke the law, it ought to respect and obey the law. It cannot expect to be recognized as an agency for collective bargaining under the law unless it proposes to observe the law in other respects. An organization which makes a rule of disregarding the law cannot ask for the recognition of the law, nor may it expect the recognition of men and women who respect the law and look to it for their security. Government employees ought not to joint an organization that does not respect and observe the laws of the Government."

In questioning the matter of a Congressional investigation of the Memorial Day riot, Senator Bailey said that "the power of Congress to sit in judgment upon acts of local police—or, for that matter, of governors or mayors—is very slim indeed." The Federal Government, he said, may interfere only where Federal functions are involved, or strictly Federal rights are in question, by reason of State action, or the maintenance of a republican form of government in any State requires the exercise of Federal powers.

The police, it was declared, exhausted peaceful methods and then met force with force. If blame must be imposed for bloodshed, the report stated, it must be imposed on the mob that resisted the law and made bloodshed unavoidable. To take any other view, the Senator pointed out, is to impose upon the guardians of the law condemnation for doing their duty, and to encourage the lawless accordingly.

"If workers desire the repeal of the Wagner Act," the report said, "the sure way to proceed is to interpret it as authorizing methods which some of their leaders have persisted in following since it was enacted. If any labor organization would have the sympathy of law-respecting citizens, it must uphold the law."

Senator Byrd Asks Government To Pay Shipper's Loss Because of CIO Interference With U. S. Mails

WASHINGTON, Aug. 3.—Even the delicious Smithfield ham has emerged as a figure in the recent CIO strikes at Ohio plants of the Republic Steel Corp. Under the censorship of John L. Lewis' pickets, Jim Farley's postal employees declined to deliver this famous palatable product of Virginia to Republic Steel Corp. officials in Cleveland, according to Senator Harry F. Byrd of the old Dominion state, a cruel denial to Republic workers' appetites and a sharp wound for the pride of any Virginian, eager to have the world eat tasty Smithfield hams. The hams were returned to the shipper. He declined to accept them. The postmaster at Smithfield, Va., auctioned them off.

The upshot is that Senator Byrd has called the Post Office Department to taw, seeking to salvage compensation for the loss suffered by the shipper, which is patheticaly little to salvage under the circumstances.

Here's the story by Senator Byrd, orthodox Democrat, who has proven himself a hairshirt for the New Deal:

"During the strike at the Republic Steel Corp. at Cleveland, in the regular and ordinary course of business, a producer of Smithfield hams at Smithfield, Va., sent by prepaid mail hams consigned to officials of the Republic Steel Corp. When the consignment arrived in Ohio strikers by lawless acts prevented the delivery. The shipment was returned to Smithfield and the postmaster attempted to collect the return postage. This charge the shipper very properly declined to pay as the Government had failed to fulfill its contract to deliver the shipment on which postage had been paid and accepted. The hams were then put at public auction by the postmaster at Smithfield, to pay the return postage, and the shipper was tendered by the postmaster a sum representing only a fraction of the value of the hams. This the shipper refused to accept.

"I am introducing a bill for the purpose of compensating the shipper for his loss by reason of the failure of the United States Government to perform its contract and make delivery. I am doing this not only as a matter of simple justice but so that the Congress of the United States will have an opportunity to go on record in condemnation of the unwillingness and lack of effort of the officials of the United States Government to deliver accepted mail merely because of strike disorders. I, for one, am unwilling to concede that any man or group of men by disorderly conduct should be permitted to interfere with the mails of the United States Government."

Warner & Swasey Co., Cleveland, shut down its plant July 30 for a two weeks' summer holiday period for the entire plant force and general office staff under a new plan which grants vacations with pay to 82 per cent of its employees. Vacations with pay range from four days for employees with 8 to 12 months' service, to two weeks for those with more than three years in the company's employ. The shops will be cleaned and painted and inventory taken before the resumption of operations Aug. 16.

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..PERSONALS..

SAMUEL B. WEBSTER has been appointed chief engineer of Vandergrift works, Carnegie-Illinois Steel Corp., succeeding WILLIAM A. MARSHALL, who was recently appointed superintendent of construction for the Irvin works. Mr. Webster formerly was a special engineer in the general offices of the company in Pittsburgh. He began his engineering career as a draftsman with Carnegie Steel Co. in 1908 and three years later joined the American Bridge Co. at Brooklyn, N. Y. Mr. Webster returned to Carnegie Steel Co. in 1921 as a draftsman in the general offices and in 1930 was promoted to the position of special engineer, serving continuously until his recent appointment.

NEAL J. CRAIN has been appointed purchasing agent, United Engineering & Foundry Co., Pittsburgh. He was formerly assistant to G. W. SANBORN, who continues as vice-president of the company in charge of purchases and traffic. Mr. Crain started with United in October, 1917, and during that time has been associated with the purchasing department.

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J. MURRAY LENHART, chief inspector at Duquesne works since Oct. 1, 1908, has been assigned to special metallurgical duties in the Pittsburgh district offices of Carnegie-Illinois Steel Corp. Mr. Lenhart has been with the company since Oct. 1, 1897, when he entered the old City Mills Co. as a testing engineer. After 10 years there he was transferred to the Sharon, Pa., plant of Carnegie Steel Co. as chief inspector. He was then made chief inspector of Duquesne works, which position he held until his present appointment.

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JOHN R. ANDERSON, formerly metallurgical contact man for the Cleveland-Buffalo district, will succeed Mr. Lenhart at Duquesne. Mr. Anderson was graduated from Lehigh University as a metallurgical engineer in 1931 and came into the United States Steel Corp. group of companies the same year as a research assistant in the Kearny, N. J., laboratories. He later was associated with the American Steel & Wire Co. in Worcester, Mass., but left in 1935 for a year, returning to Carnegie-Illinois in 1936.

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WILLIAM J. DAVIDSON, who has been with the General Motors Corp. since he joined the Cadillac engineering staff in 1914, has been named general sales manager of the Winton Engine Corp., the diesel division of General Motors. Mr. Davidson was at one time executive secretary of the general technical committee, under which the well-known General Motors proving ground was built and first operated. He has also been executive secretary of the new devices committee of General Motors and in recent years has been technical director serving under R. H. GRANT, sales vice-president.

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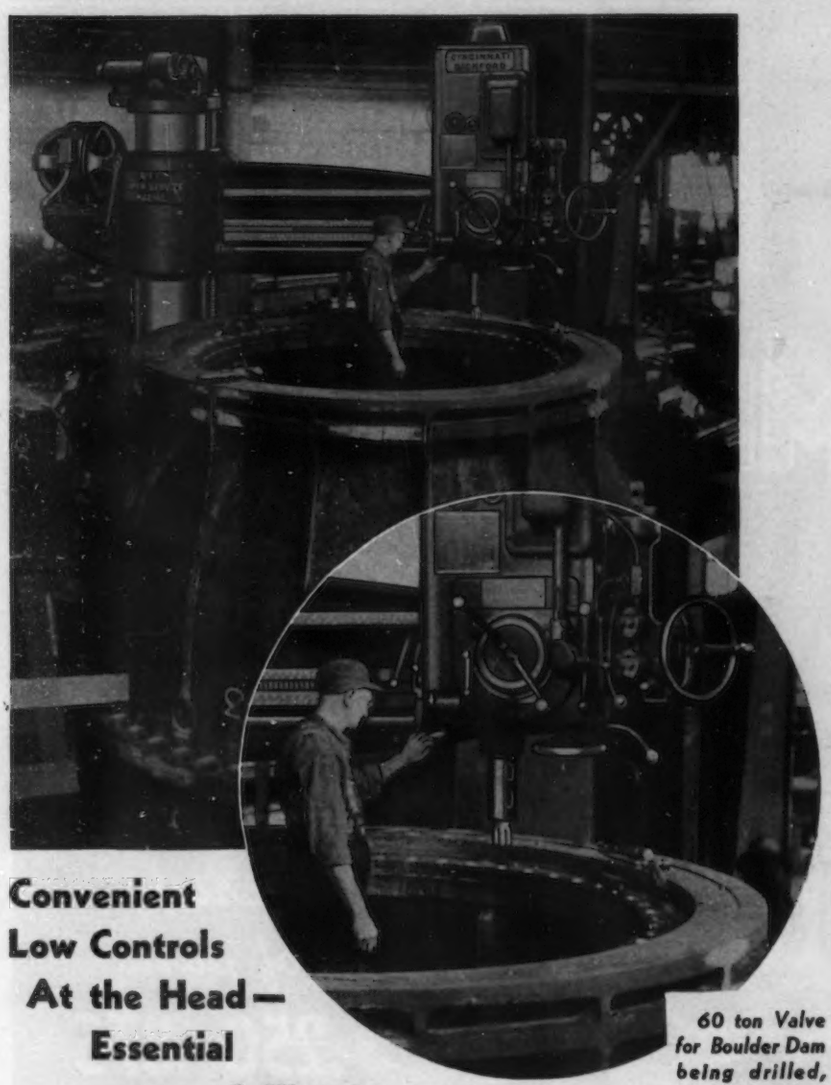
OWEN C. JONES has been appointed assistant to president and has been placed in charge of sales promotion for the Laminated Shim Co., Inc., Long Island City, N. Y. Mr. Jones has for the past six years been associated with the general publicity department of the Linde Air Products Co., a unit of Union Carbide & Carbon Corp.



Convenient Low Controls At the Head— Essential on work like this

60 ton Valve for Boulder Dam being drilled, tapped and spotfaced on the Super Service Radial at the Thomas Spacing Machine Company, Pittsburgh.

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And only Super Service Radials have this feature, regardless of the type of driving motor. Investigate the other advantages of having all speed changes in the head.

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G. F. AHLBRANDT

W. W. LEWIS

H. M. RICHARDS

G. F. AHLBRANDT and W. W. Lewis, whose appointment as assistant vice-presidents of the American Rolling Mill Co. was announced in last week's issue, page 72, and H. M. Richards, who has been made manager of the sheet and strip sales division.

PAUL JONES, newspaper man and promotion editor of the Cleveland Press for the past two years, has been named director of the publicity division of the National Safety Council, Chicago. He succeeds TOM A. BURKE, who resigned recently to become executive secretary of the Advertising Club of New York.

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JAMES L. MONAGHAN, president and general manager, Filer & Stowell Co., Milwaukee, on July 27 observed the fiftieth anniversary of his connection with the company, which manufactures a varied line of steam engines, air compressors, hoists, sawmill machinery, conveying and transmission equipment. He resigned as a school teacher at East Troy, Wis., in 1887 to start as a clerk in the Filer & Stowell office. He became president in 1922.

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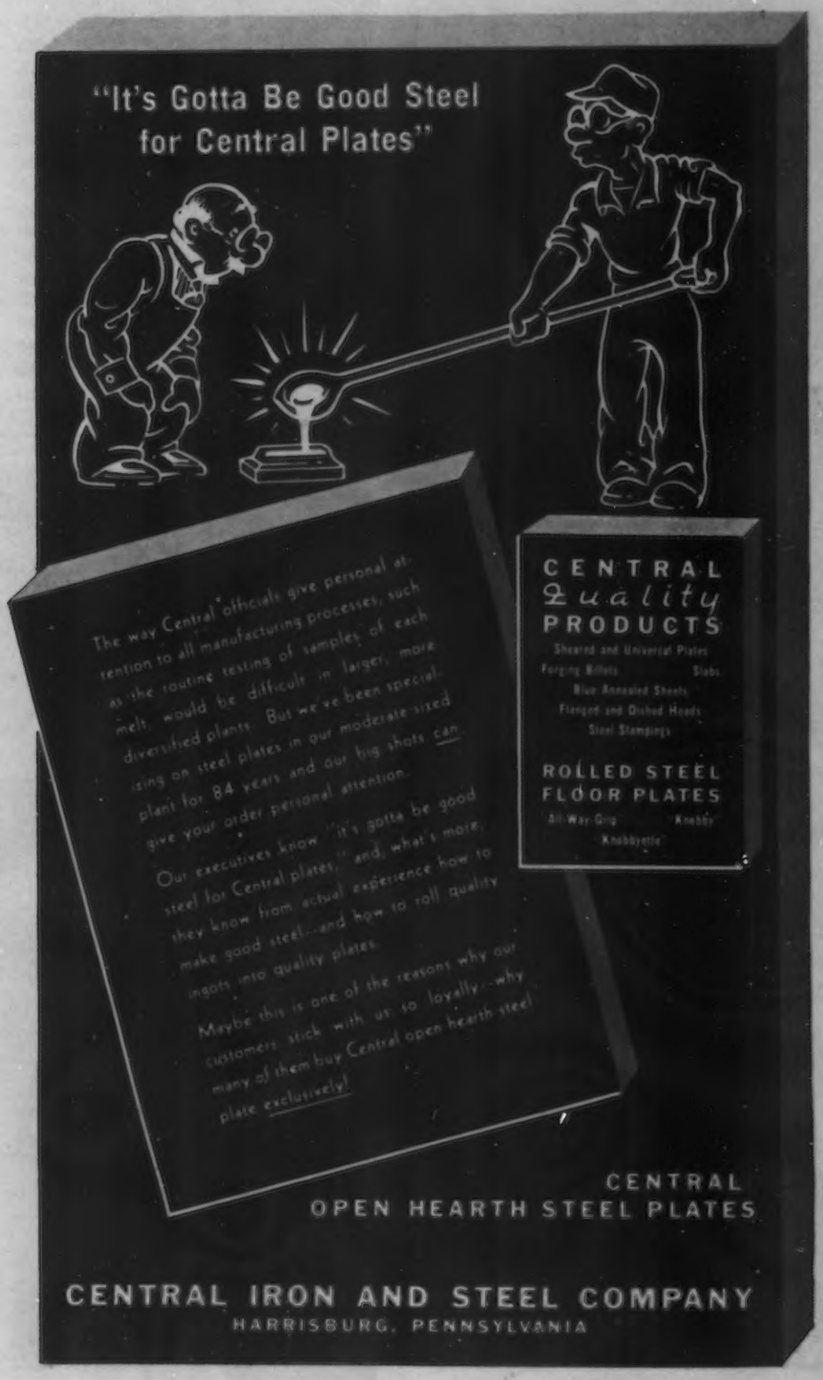
H. L. PIERSON, president of the Detroit Harvester Co. and a member of the board of the Eaton Mfg. Co., has been elected chairman of the board of the Eaton-Erb Foun-


"It's Gotta Be Good Steel for Central Plates"
The way Central officials give personal attention to all manufacturing processes, such as the routine testing of samples of each melt, would be difficult in larger, more diversified plants. But we've been specializing on steel plates in our moderate-sized plant for 84 years and our big shots can give your order personal attention.
Our executives know "it's gotta be good steel for Central plates," and, what's more, they know from actual experience how to make good steel—and how to roll quality ingots into quality plates.
Maybe this is one of the reasons why our customers stick with us so loyally—why many of them buy Central open hearth steel plate exclusively!
CENTRAL Quality PRODUCTS
Sheared and Universal Plates
Forging Billets
Slabs
Blue Annealed Sheets
Flanged and Dished Heads
Steel Stampings
ROLLED STEEL FLOOR PLATES
All-Way Grip
Knobby
Knobbyette
CENTRAL OPEN HEARTH STEEL PLATES
CENTRAL IRON AND STEEL COMPANY
HARRISBURG, PENNSYLVANIA

dry Co., Detroit. JOSEPH L. DOSTAL, formerly vice-president in charge of engineering and research, has been elected president of the foundry company, and EDWARD C. HOENICKE, formerly sales manager, has been made vice-president.

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WILLIAM KERKHOFF, JR., has been made manager of the New Orleans sub-office of the Tennessee Coal, Iron & Railroad Co., succeeding JOHN P. PANNILL, who has retired under the United States Steel Corp. pension plan. Mr. Kerkhoff has been associated with the corporation and its subsidiaries 28 years. He entered the service of the United States Steel Products Co. in 1909, taking a position in the New York traffic department. Nine years later he joined the foreign service division of the sales department in 1918, and in 1921 was transferred to the New Orleans office. He was shifted to the New Orleans staff of the Carnegie Steel Co. in 1923, American Sheet & Tin Plate Co. in 1925, and to the Tennessee Coal, Iron & Railroad Co. in 1932.

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DR. A. GIRARD CRANCH, medical director National Carbon Co., Inc., Cleveland, and director of the Cleveland Academy of Medicine, will be transferred to New York, Aug. 1, to organize and direct a department of industrial toxicology for the Union Carbide & Carbon Co., of which the Cleveland company is a unit.

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ROSS L. LEFFLER of McKeesport, Pa., manager of industrial relations for the Pittsburgh district, Carnegie-Illinois Steel Corp., has been reappointed a member of the Pennsylvania Game Commission.

Steel Engineers Plan Big Gathering

OVER 5000 steel mill engineers and executives are expected to attend the thirty-third annual convention and Iron and Steel Exposition, which will be held in the Stevens Hotel, Chicago, Sept. 28, 29, 30 and Oct. 1.

About 25 papers dealing with actual operating problems in the industry will be presented by technical authorities. Along with the technical program, 150 manufacturers of steel mill equipment will display their various products in the Iron and Steel Exposition.

Inspection trips to the Gary sheet and tin division of the Carnegie-Illinois Steel Corp. and the Indiana Harbor works of the Inland Steel Co. will be on the program.

...OBITUARY...

MAJOR ROBERT ALEXANDER BULL, one of the country's outstanding steel casting metallurgists, died on July 29 in Anniston, Ala. Major Bull was in the South engaged in consultation work for the Kilby Car & Foundry Co. in Anniston and died at the home of Mr. Kilby.

Major Bull was born in New Albany, Ind., on June 28, 1874. He received his B.A. from Butler University and an M.A. degree from St. Louis University. He was identified successively with Robert W. Hunt & Co., American Cast Iron Pipe & Foundry Co., Shickle, Harrison & Howard Iron Co., American Steel Foundries, Commonwealth Steel Co., Duquesne Steel Foundry Co., and headed the Electric Steel Founders Research Association. He was a member of a number of technical societies, including the American Foundrymen's Association, of which he was president from 1914 to 1916, American Institute of Mining and Metallurgical Engineers, American Society for Testing Materials, American Welding Society and the American Iron and Steel Institute.

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HOMER C. GERWIG, assistant general manager of sales, National Tube Co., Pittsburgh, died in that city on July 21. He was born in Pittsburgh in 1887, was graduated from Lehigh University in 1910 and shortly thereafter entered the general engineering department of National Tube Co. In 1915 he was transferred to the general sales department and in 1931 was made assistant general manager of sales, in which capacity he served to the time of his death.

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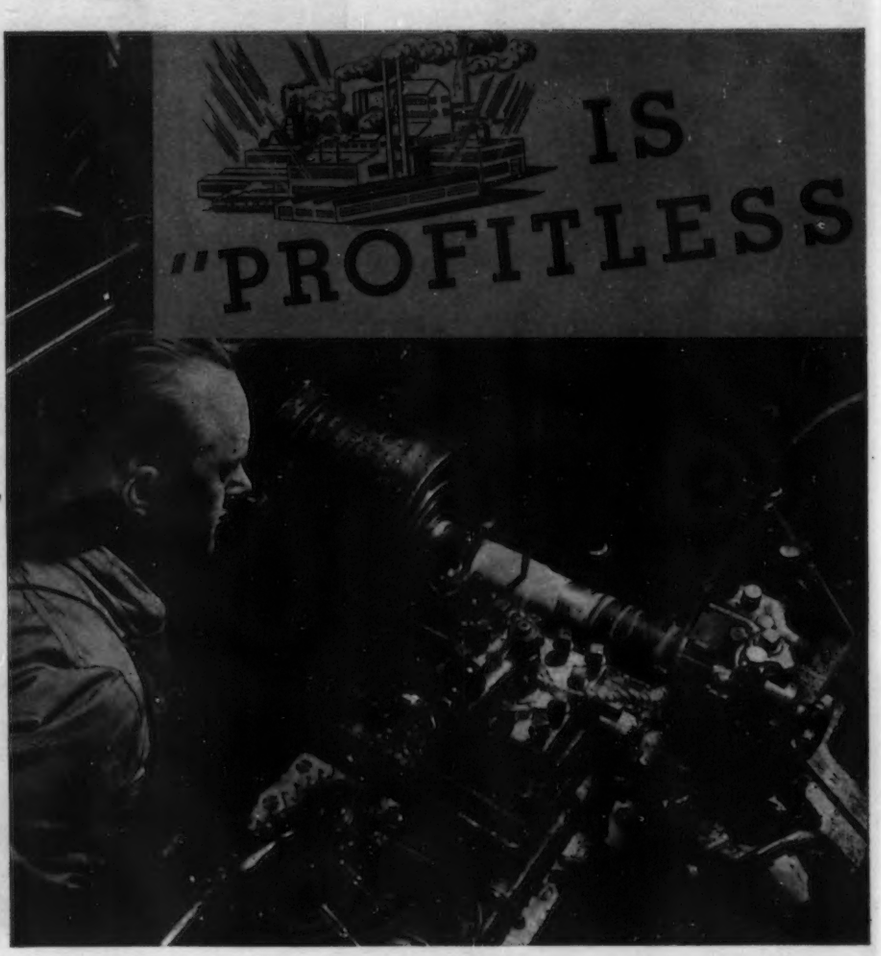
CHARLES B. WILSON, a cofounder of the Wilson Foundry & Machine Co., Pontiac, Mich., and a pioneer in the automobile industry, died July 23 in his home after a long illness. Mr. Wilson was born Feb. 19, 1872, at Warren, Ohio, was educated in the Akron public schools and studied mechanical engineering in night classes. His first position in the automobile industry



was as superintendent of the Olds Motor Works, 1898 to 1906. Later he was general manager of the Willys-Overland Co. In 1914 he and his brother, David R. Wilson, organized their company at Pontiac. At the time of his death he was chairman of the board of that company, as well as board chairman and treasurer of the Baldwin Rubber Co., Pontiac. During the World War, he was vice-president and manager of all Curtiss Airplane Corp. plants in the United States and Canada. He was at one time president of the Pontiac Chamber of Commerce, had taken an active part in civic affairs and served as conservator of the Pontiac First National Bank. He also served as Poor Commissioner of Oakland County from 1931 to 1933. Mr. Wilson was a member of the American Society of Mechanical Engineers and the American Foundrymen's Association.

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R. R. HUGGINS, JR., sales manager and vice-president of the Thermal Products Corp., Pittsburgh, died recently in that city at the age of 32 years. Mr. Huggins attended Shadyside Academy and the University of Pittsburgh. Shortly after leaving the latter school he became associated with the Standard Sanitary Mfg. Co. at Washington. He later entered the employ of the Campbell-Huggins Donat Co. and the Thermal Products Corp., both of Pittsburgh, which connections he maintained up to the time of his death.

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ALEXANDER RICE MCKIM, former New York structural engineer specializing in railroad work and bridges, died July 28 at a hospital in Marblehead, Mass., aged 74 years. He received a civil engineering degree from Massachusetts Institute of Technology in 1886, an A.M. degree from Columbia University, and studied at the Technische Hochschule in Berlin.

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EDWIN F. RAUSS, assistant to the superintendent at Cadillac Motor Car Co., and identified with the automobile industry in Detroit for more than 30 years, died of a heart attack at his desk late last Friday afternoon. He was 49 years old. Mr. Rauss went to work for the Packard Motor Co. in 1906. Later he assisted in organizing the Parker Rust-Proof Co. and subsequently was connected with the Hudson Motor Car Co. He had been with Cadillac for the last 17 years.

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F. W. SARGENT, since 1902 chief engineer of the American Brake Shoe & Foundry Co., New York, died on July 25 at his home in Mahwah, N. J. Mr. Sargent was generally credited by the railroad industry with having done more than any other man in the development of brake shoes for steam and electric trains.

On graduating from Lehigh University as a civil engineer in 1879, Mr. Sargent spent a year with the Rio Grande Construction Co. Thereafter he was successively assistant engineer on survey and construction with the Mexican National Construction Co.; resident engineer of construction for the Norfolk & Western Railroad Co.; engineer of tests with the Chicago, Burlington & Quincy Railroad; with the Congdon Brake Shoe Co., Chicago; chief engineer of the Sargent Co., Chicago, from 1893 until he joined the American Brake Shoe & Foundry Co. in 1902.

R. A. BULL

H. C. GERWIG

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1—cut material waste (Warner & Swasey Turret Lathes reduce scrap loss, save material by reducing handlings—in one case material used was cut 30%).

2—get more efficiency in production (Warner & Swasey Turret Lathes reduce operator fatigue and error, speed output—in many cases cut cost per piece 50%).

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The arithmetic of profit is simple—*keep costs down.* Warner & Swasey has helped hundreds of plants do it. You can have the benefit of this specific experience. Write

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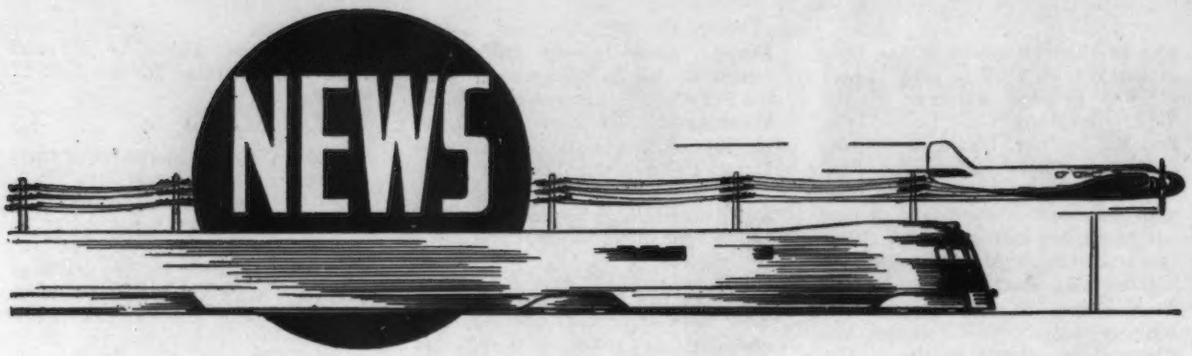

Wage Rates in Steel Industry Are Uniform As to Districts

IN recent discussions of wages paid by steel companies the assumption has been common that there are wide variants in the basic rate of pay of different companies producing the same goods in the same area.

Senator Ellender of Louisiana, discussing the steel strike situation in a recent address in the United States Senate, told of the testimony on this subject by Philip Murray, chairman of the Steel Workers Organizing Committee. Senator Ellender said:

"This organizer of labor (Philip Murray) admitted that there was no election held among the employees of the Republic Steel Corp., Youngstown Sheet & Tube Co. and Inland Steel Co., in accordance with the requirements of the Wagner Act. He admitted that the workers at those plants were accorded the same rights and privileges, the identical amount of wages, and worked the same number of hours, with the same pay for overtime, as any other men working in the steel industry were receiving, and the only cause for complaint between his organization and these steel companies was that there was no written agreement between them."

Senator Ellender referred to those companies with regard to which Philip Murray had testified before the Committee on Post Offices and Post Roads, but an investigation by THE IRON AGE reveals that other major companies, such as United States Steel, Bethlehem and National Steel, pay the prevailing rates of wages in the districts in which they operate.

Various Rates of Pay

Evidence that steel companies with plants distributed throughout the country are paying uniform wages in given districts is found in the average earnings per hour of all employees. The 1936 annual report of the United States Steel Corp. shows its employees earned an average of 73.7c. per hr. Comparable figures for leading steel companies for 1936 were as follows:

United States Steel	73.7c. per hr.
Bethlehem Steel	73.6c. " "
Republic Steel	74.6c. " "
Jones & Laughlin Steel	73.5c. " "
Youngstown Sheet & Tube	73.4c. " "
Inland Steel	73.5c. " "
National Steel	74.9c. " "

These figures, of course, do not reflect the present earnings of steel workers. There was an hourly increase of 5½c. last November and a 10c. per hr. increase in March of this year throughout the industry.

The average hourly earnings, as set forth above, are surprisingly close when the size and geographical distribution of plants of the various companies are considered.

NEWS AND MARKET INDEX

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PROFIT *from the word* GO!

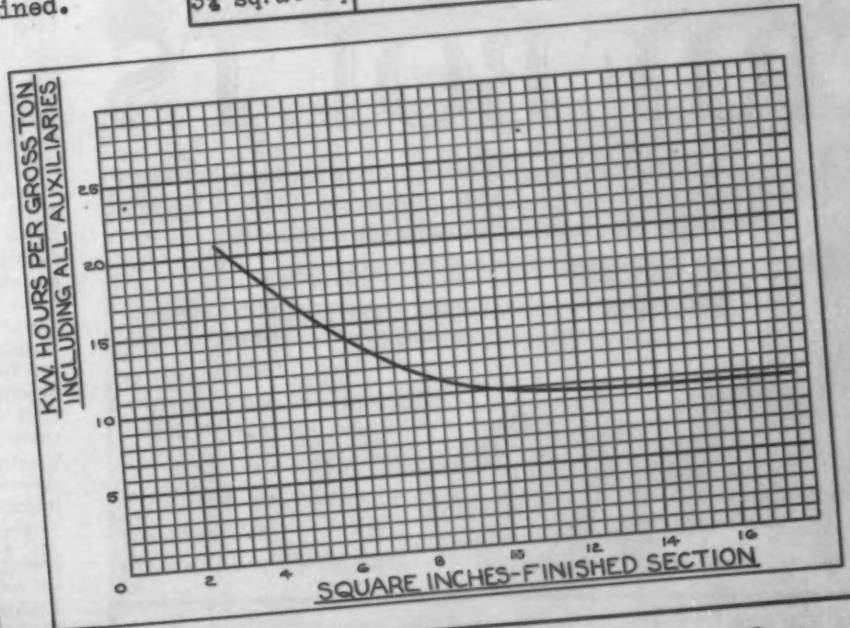
ENGINEERS REPORT

At Guest, Keen, Baldwin, Ltd., England --

From the day it started 17 Jan.-1936, this 19" billet and sheet bar mill has "made money." Equipped throughout with Morgoil Bearings, it has shown a most satisfactory power consumption. This is clearly indicated by the following data which is a matter of record.

SIZE	GROSS TONS	KW.HRS. PER TON	KW.HRS.AV.
2 x 2	23,348	426,890	18.25
2¼x2¼	9,024	139,670	15.45
2½x2½	6,296	89,020	14.15
3 x 3	1,126	11,610	10.36
3¼x3¼	4,837	50,920	10.51
3¾"sq.&4"sq.	9,890	97,130	9.83

These power consumption figures gain added importance when it is realized that the kilowatt hours per gross ton include not only the main mill motors but also all auxiliary drives, cranes, pumps, lighting, etc., for the period during which the figures were obtained.



R-21

MORGAN WORCESTER ENGINEERS AND MANUFACTURERS

Continuous Rolling Mills

MORGAN CONSTRUCTION COMPANY, WORCESTER, MASS.

Moreover the factor of product specialization, requiring differing classifications of labor, does not appear to materially affect the averages.

The basic rate of pay in the steel industry, as in most other industries, does vary somewhat for different districts—but the effect upon average employee earnings is nil and these variants are general and for all companies. They usually arise out of local conditions. This same principle holds true in many other industries.

The hourly basic rate does not give an adequate picture of what the average steel worker earns, because this figure represents the bottom pay for common labor. In the steel industry, only about 7 per cent of the workers are common laborers. The remainder, and for that matter some of the common laborers who do special jobs, receive higher pay.

For a more correct perspective of the industry, it is necessary to include figures showing the current earnings of the workers—that is, steel employees, excluding management, supervision or the white collar office worker. The last figure available as reported by the American Iron and Steel Institute is for May and shows that hourly average earnings are 86.6c. Total employment for May was 498,176.

DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL CONNECTICUT

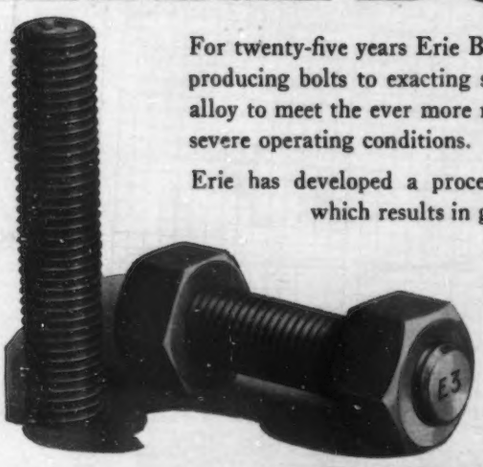
Many Water Systems Must Be Enlarged

A STUDY completed by the Marketing Research Division, Department of Commerce, Washington, points to the probable expenditure of millions of dollars for water works equipment, sanitary works equipment, cast iron pipe and other materials because of the rapid growth of the use of air conditioning. Many municipal water supply systems are now approaching the point of an overload, it is stated, owing to increased use of water for air conditioning, and the growth of air conditioning in those cities may be checked until additional water supply facilities can be provided.

Installations of air conditioning units had increased approximately 1400 per cent from 1933 to the end of 1936, the report states, yet the trend of air conditioning sales continues upward this year more sharply than in any past year. Certain cities, including Atlanta, Ga.; Chattanooga, Tenn.; Columbus, Ohio; Dallas, Tex.; St. Paul, Minn.; Scranton, Pa., and South Bend, Ind., are now using the full capacity of their water systems and are not in a position to furnish additional water until the systems have been enlarged, according to the study. In Chicago the further installation of air conditioning systems in the loop district is being discouraged unless the building has a cooling tower or is otherwise equipped to obviate the necessity of discharging water into the sewerage system.

A bulletin titled "Effect of City Water and Sewerage Facilities on the Market for Air Conditioning Equipment," (Market Research Series No. 16) has been published and may be obtained for 10c. from the Bureau of Foreign and Domestic Commerce or any of its branches.

ERIE BOLTS



For twenty-five years Erie Bolt & Nut Company has been producing bolts to exacting standards made of the proper alloy to meet the ever more rigid specifications imposed by severe operating conditions.

Erie has developed a process of manufacturing threads which results in great accuracy and smoothness of thread, thereby eliminating, to some extent, seizure under high temperatures.

Write for two new close tolerance thread specifications developed by Erie.

ERIE BOLT & NUT CO.
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New York Adopts New Building Code; Fusion Welding Sanctioned

THE new city building code, passed by the Board of Aldermen of New York City on July 13, to become effective on Jan. 1, 1938, permits the use of fusion welding in the erection of all new buildings. Although the insertion of the welding clause was a much debated issue, few immediate benefits will accrue to builders or welding equipment manufacturers, chiefly because most construction companies are set up for riveting and will be in no hurry to change over to welding until more definite facts are available on the cost of welded buildings.

Previous to the passage of the code, the only buildings erected with welded construction were Federal and State projects which are outside the jurisdiction of the city code. The Brooklyn-State Hospital in Brooklyn, recently completed, is an excellent example of this type of all-welded construction.

Since the world's first welded building was erected 17 years ago, several hundred buildings of welded construction have been built in this country and abroad, including buildings at Yale, Vassar, Mt. Holyoke and Trinity College, hospitals in New Haven and Brooklyn, schools in Mt. Vernon, N. Y., and Greenwich, Conn., the recent addition to the Bank of England, and also numerous factory buildings, bridges, oil refineries and other structures. According to Gilbert D. Fish, Chairman, Committee on Building Codes, American Welding Society, New York, no welded work has ever failed.

Following are some excerpts from the code pertaining to welding operations:

Welded joints shall be so proportioned that the maximum stresses shall be less than the following amounts in lb. per sq. in.:

Shear on section through throat of weld	11,300
Tension on section through throat of weld	13,000
Compression on section through throat of weld	15,000

Fusion welding may be substituted for, and used in combination with, riveting or bolting to connect or assemble component parts of steel beams, girders, lintels, trusses, columns and other structural steel used in building construction, if done under rigid inspection and specification, in accordance with the rules of the city.

Fillet welds connecting the component parts of a built-up column may be either continuous or intermittent. If intermittent, the length of each weld at the ends of the column shall be equal to the least width of the column. The length of the intervening welds shall be at least one and one-half inches, spaced at most four inches in the clear.

The supplanted code, issued in 1915, had no provisions relating to the use of alloy steel. The new code takes cognizance of the increased use of this steel and includes specifications for the allowable working stresses of silicon and nickel steels, which are 24,000 and 25,500 lb. per sq. in. respectively. Working stresses permitted with structural steel have been increased from 16,000 to 18,000 lb. per sq. in. in recognition of the greater strengths developed in modern steel. The code also provides for a new type, low cost housing using steel mesh and is expected to stimulate the use of this material.

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Steel Earnings Consistently Higher; E. G. Grace Sees Pick-up in Demand

SIGNS of a pick-up in general demand were visible, Eugene G. Grace, president, Bethlehem Steel Corp., said in a press interview held after the regular quarterly directors' meeting on July 29. Mr. Grace said he thought the seasonal low point had been reached, and, although current new business was not supporting operations, it was quite satisfactory.

The net income of the corporation for the second quarter ended June 30, after all deductions but the surtax on undistributed earnings, was $10,022,874. This was equivalent, after preferred allowances, to $2.56 a share on common stock, as compared with $3,431,391, or 49c. a share in a similar period in 1936. Dividends of $1.75 on the 7 per cent preferred, 25c. on the 5 per cent preferred and $1.50 on common stock were declared after the board meeting. Common stock dividend in the previous quarter was $1. Income after interest and other charges, but before provisions for depletion and depreciation, amounted to $14,047,273, as against $7,591,349 in a comparable period last year.

Statistics presented by Mr. Grace indicated that employment for the second quarter averaged 102,000 men, against 73,603 in a like period in 1936, and gross payrolls were $48,000,000 in the second quarter of this year and $29,000,000 in the 1936 period.

The tin plate mill at Sparrows Point, with a capacity of 15,000 tons a month, went into operation this week.

Income Reports of Other Companies

Republic Steel Corp. reported a net income of $487,251 in the June quarter against $5,567,000 in the first quarter. Six months' profits were $6,054,315, compared with $3,022,094 in the first half of 1936.

Superior Steel Corp.'s net earnings, after depreciation, interest, Federal taxes and other charges, were $120,648, or $1.05 a share on 114,276 shares of $100-par value capital stock, in the second quarter. Like quarter last year showed earnings of $58,726, or 52c. a share on 113,576 shares of capital stock.

Inland Steel Co. declared an extra dividend of 50c. a share, as well as the regular dividend of $1, payable on Sept. 1 to stockholders of record on Aug. 1, at the quarterly meeting of the directors. Profits for the second quarter were $3,178,383, after deductions, but before surtax on undistributed earnings, equal to $2.02 each on 1,573,950 shares outstanding, and compares with $3,298,191, or $2.29 each on 1,440,000 shares of common stock in the same period in 1936.

Allegheny Steel Co.'s operations resulted in June quarter profits of $864,449, after deductions, but before the surtax. This was equal to $1.07 a share on 752,285 shares of no-par common stock. Second quarter profits in 1936 were $610,805, or 90c. a share on 613,785 shares of common stock.

Ludlum Steel Co. and subsidiaries reported net income for the quarter of $506,087, or $1.02 each on 497,600 common shares, after depreciation, etc. Profits of a comparable period last year were

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$271,369, or 55c. each on 495,477 common shares.

Otis Steel Co.'s earnings for the June quarter were $1,040,424 after provisions for all charges. Half year figure was $1,742,820 as against $900,349 for the first six months of 1936.

National Steel Corp.'s net income after all deductions, except surtax, for the second quarter was $6,013,076, equal to $2.77 per share on capital stock. Same quarter last year showed an income of $2,805,570, or $1.30 per share.

Interlake Iron Corp.'s president, C. D. Caldwell, predicted that if current earnings are maintained, the corporation should be in a position to resume payments on common stock shortly. June quarter earnings were $572,835, or 29c. a share, as against $372,202, or 19c. a share for the March quarter, and a net loss of $48,978 for the second quarter of 1936.

Youngstown Sheet & Tube Co. and subsidiaries reported net profit of $2,022,112 for the second quarter, equal, after dividend requirements of preferred stock, to $1.14 a share on 1,590,720 shares of common stock. This compares with a net of $4,886,019, or $3.05 a share on 1,534,848 common shares in the first quarter. Operations in June quarter averaged 57.6 per cent against 86.7 per cent in the March quarter.

Wheeling Steel Corp. and subsidiaries for the quarter ended June 30, reported net income of $2,463,034 before surtax, which was equal, after preferred dividend requirements, to $4.87 a common share. Similar period in 1936 netted earnings of $871,277, or 77c. a share on common stock.

Blaw-Knox Co.'s net profits for the six months ended June 30 were $1,295,513 before surtax, equivalent to 97c. per share on outstanding capital stock. Corresponding period in 1936 showed profits of $675,293, or 51c. a share. Interim dividends amounting to 45c. a share have been paid during the six months period just passed.

Baldwin Locomotive Works and subsidiary companies, including Midvale Co. had net loss of $508,371 reported for the 12 months ended June 30, after all charges including deduction of minority interest of Midvale Co. This compares with a net loss of $2,809,720 for the 12-month period ended June 30, 1936. Sales for the period covered by the report were $30,377,714, as against $16,797,451 in a comparable period last year. Unfilled orders amounted to $29,805,293 on June 30.

Japan Progressing on Electrolytic Recovery Of Iron From Sand

TOKYO (*Special Correspondence*).—The Japan Iron Mfg. Co., Japan's largest producer of iron and steel, has made arrangements for buying ore from an iron mine on Samar Island, the Philippines. The company's experts inspected the mine last year, according to the *Nikkan Kogyo*, and a recent experiment on a 500-ton sample was satisfactory, it is said. The mine is expected to supply at least a part of the 2,000,000 metric tons of ore Japan Iron Mfg. Co. needs annually. The amount contracted for has not been revealed.

Electrolytic Iron Manufacture

At a meeting of the Electric Power League of Japan Mr. Godo, former minister of Commerce and industry, and Mr. Matsunaga, of Toho Electric Co., reported on the

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At least two of our Wyandotte products could almost qualify as universal metal cleaners. They give perfect results under most conditions—better than average for any kind of work.

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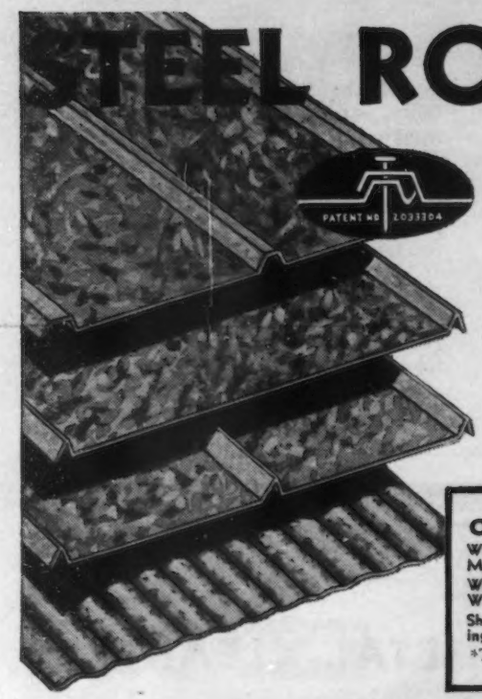
STEEL ROOFING



Every application of steel roofing and siding is covered in Continental's 14 styles. The new "Tyl-Lyke" with its wide rib design combines a new style in steel roofing with a new patented lap. All styles, in wide variety of lengths and gauges, are made from special analysis (or .20% minimum copper-bearing) basic open hearth steel, galvanized by the SUPERIOR PROCESS. Ridge roll and other accessories are furnished for all styles.

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progress of work at the Chuo plant at Naoetsu, whereby the so-called Higuchi process iron is recovered from poor ores by means of electric current. The process was recommended to the "big five" power companies for adoption.

By the process in question, iron sand or crushed ore is concentrated to 60 per cent by magnetism. The product is heated to 1800 deg. C. in a specially designed electrolytic oven. Vanadium and titanium are separated out. Steel is then directly produced without going through the pig iron stage. The furnaces are built in 10,000-kw. units and are capable of producing 45 metric tons of steel a day.

If energy is supplied at an annual rate of 33.50 yen per unit ($9.70), the cost of production is 56 yen ($16) per ton. The proposal is to produce 500,000 metric tons a year by use of 300,000 units of current. The total deposits of iron sand in Japan are rated at a billion tons. The aforementioned five major electric companies are to form a combine with a capital of well over 100 million yen to commercialize the process on a large scale.

The Kawasaki Dockyard Co. is collaborating with the Krupp A.G., of Essen, Germany, in the development of another process for working of poor ores and iron sand. A quantity of sand has been shipped from Aomori to the German company's laboratories.

Mac Kenzie to Present Paper to British Foundrymen

THE American Foundrymen's Association has selected Dr. James T. Mac Kenzie, chief metallurgist, The American Cast Iron Pipe Co., Birmingham, to present the association's official Exchange Paper before the 1938 meeting of the Institute of British Foundrymen. Dr. Mac Kenzie's paper will review research work on chemical changes of cast iron in cupola melting. He is one of the foremost world authorities on this subject and has been a prominent leader in the activities of the A.F.A. and other technical associations. At the 1937 convention of the A.F.A. Dr. Mac Kenzie was awarded the association's J. H. Whiting gold medal for important and practical work in the advancement of gray iron foundry practice.

A. F. A. Selects Author For Exchange Paper

THE American Foundrymen's Association has selected Dr. James T. MacKenzie, chief metallurgist, the American Cast Iron Pipe Co., Birmingham, to present the association's official exchange paper before the 1938 meeting of the Institute of British Foundrymen.

R. JAMES T. MACKENZIE

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This paper is one in a series instituted in 1920 to promote the exchange of foundry knowledge between members of the various national associations of America and Europe. Some 300 papers have so far resulted from this arrangement. Further, a series of international foundry congresses has been instituted, being controlled by a committee of representatives of the various national associations including the A.F.A., the Institute of British Foundrymen and the foundry associations of France, Belgium, Italy, Poland, Czechoslovakia, Germany and Holland.

Manufacture of two more 82,500 kilovolt-ampere generators for use at Boulder Dam is covered in a contract awarded last week by Secretary of the Interior Harold L. Ickes to the Westinghouse Electric & Mfg. Co., on its bid of $1,467,000.

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Model 273

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Magnesite Brick Has A Steel Case

AN improved form of steel-encased magnesite refractory brick, H-W Improved Metalkase, is now being supplied by the Harbison-Walker Refractories Co., Pittsburgh, for industrial furnace application where operating conditions are unusually severe.

The brick itself is of chemically bonded magnesite, providing the high refractory qualities and resistance to corrosive basic slags characteristic of this material. After being molded to accurate size under very heavy pressure, each brick is encased on three sides in a "form fitting" jacket of mild steel. As these bricks are generally laid as headers, this means that the furnace wall or lining will be built up with each brick completely steel jacketed except at the ends.

At the operating temperatures, the ends of the steel jackets at the heated face oxidize and melt, fusing with the brick itself to form a monolithic surface. However, at a short distance back from the hot face the steel remains intact, adding greatly to the resistance of the wall to spalling influences and to the internal strength of the entire structure.

Recommended applications for the H-W Improved Metalkase brick include walls of basic open hearth and electric steel furnaces, in

which slag line conditions result in unusually severe corrosive action, as well as linings of cement and dolomite kilns, and other high temperature kilns when physical strength and resistance to corrosive basic slags are equally essential.

Brassert to Build German Steel Plants

The Berlin branch of H. A. Brassert & Co., Chicago, has been awarded a contract by the German Government to build and put into operation three complete new iron and steel works. These works will be located on the native ore deposits. One plant will be built in North Germany near Brunswick, one in Bavaria and one in Baden in accordance with the government's program to increase the use of native resources.

The first plant will be of very large capacity. All three plants will use the new basic Bessemer process as developed in recent years at the Corby iron and steel plant, which was built by Mr. Brassert for Stewarts & Lloyds, Ltd., of England. The new plants will include equipment for ore mining and preparation, coke ovens, blast furnaces, steel works and rolling mills.

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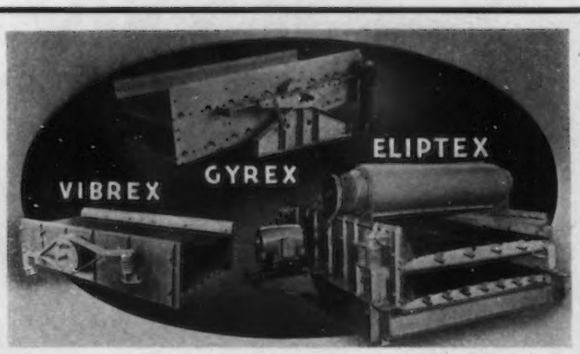

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Allis-Chalmers Sales Exceed Those of 1929

ALLIS-CHALMERS MFG. CO. reports that orders booked during the first half exceeded bookings for the entire year 1929 by a substantial margin and billings were only slightly less than in all of 1929. Sales billed for the first half of 1937 were only 26 per cent under the full 1936 year and bookings were only 19 per cent below the 1936 total. Unfilled orders as of June 30 were reported at $23,118,357 as compared with $20,235,507 at the end of the first quarter this year and $10,776,376 on June 30, 1936. Bookings for the first half of the year amounted to $52,996,832 as against $30,664,836 a year ago, while billings totaled $43,696,812 as compared with $27,399,052 for the first six months last year.

200,000 Industrial Eye Injuries Per Year

EYE injuries cost American industry approximately $50 millions per year, according to C. O. Cozzens, vice-president, American Optical Co. Average costs vary from $250 for a repairable injury to $2,000 for a total loss. It is estimated that these losses could be cut in half in a year's time by the application of ordinary safety precautions.

Inland Steel Makes Record on Strip

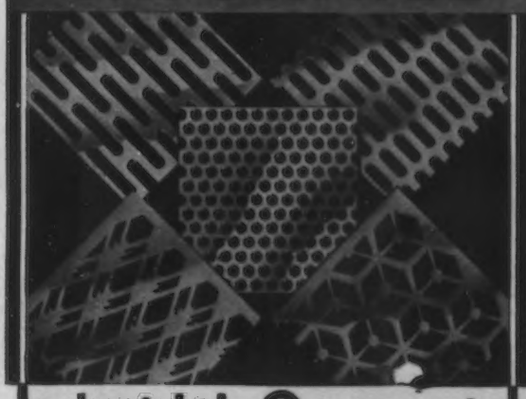
INLAND STEEL CO. has chalked up a new record since resuming operations July 1 after its strike. The 76-in. hot strip mill crew produced 1677 tons in an 8-hr. shift.

Behind the Scenes Of Business

THE new 1937 edition of "Behind the Scenes of Business" by Roy A. Foulke, Dun & Bradstreet analyst, contains 60 sets of important balance sheet and operating ratios among manufacturers, wholesalers, and retailers, as against 54 lines covered in the previous edition. The ratios are the result of a comprehensive study of 47,980 balance sheets during the past five years. The tables are not only widely applied in business, but have been introduced in economic classes in leading American colleges and universities. A new feature of the appendix is a list of "terms of sale" in 60 lines of industry. The "terms" are based on the examination of thousands of credit reports in the manufacturing, wholesaling, and retailing classifications in order to ascertain the prevalent and typical conditions of sale in current use.

New chapters in the current edition deal with effects of age, and over-expansion in business enterprises, and the imperative need for a personal "conscience" in the management of larger corporations. Mr. Foulke has pertinent remarks to offer on business prophets who are willing exponents of a wish fulfillment formula.

PERFORATED METALS



Industrial - Ornamental

ANY METAL ANY PERFORATION

INDUSTRIAL—Whether your screening problems include very coarse or extremely fine materials, you will obtain the best results with perforated metal. H & K screens have increasingly served in all fields of industry for many years and established an unequaled standard in lasting performance. Regardless of size, metal or perforation, permit us to discuss your requirements with you.

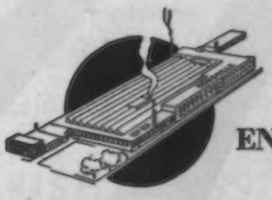
ORNAMENTAL—Beauty of ornamental grilles depend largely on the experience of the designer and producer. Experience has built a complete assortment of H&K ornamental grilles that will satisfy your wants in both design and price.

Write us for further information.

The Harrington & King Perforating Co.

5657 FILLMORE ST., CHICAGO 114 LIBERTY ST., NEW YORK

YOU probably aren't an automobile manufacturer. You probably aren't interested in piston pins. But it may interest you to know that Houde produces them for one of America's largest automobile companies — that Houde also produces an infinite diversity of metal parts and assemblies for scores of other manufacturers strictly on a basis of speed, precision and lower costs. Perhaps we can do it for you.

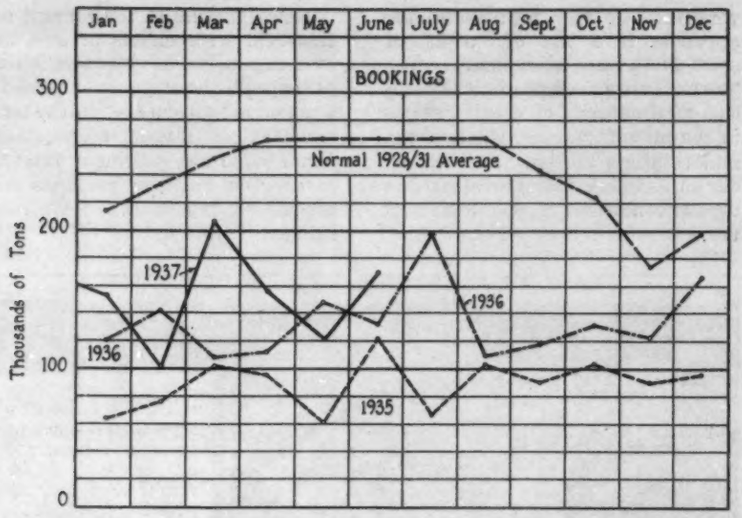


HOUDE

ENGINEERING CORPORATION

BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION



Fabricated Steel Orders Climb

NEW orders for fabricated structural steel climbed sharply during June, after declining from the high point of March. Figures released by the American Institute of Steel Construction show an estimated tonnage of 169,792 for June as compared with 121,481 for May and 206,321 for March. In June, 1936, the total tonnage on contracts closed was 132,387. New orders booked in June were 72.6 per cent of normal, whereas the orders booked during the first six months averaged 64.8 per cent of normal. The comparative bookings for the last three years are shown in the accompanying chart.

Shipments were also slightly larger during June, at 140,125 tons, as compared with 137,683 for May, but were less than the June, 1936, shipments of 154,470 tons. Shipments for June of the current year were 59.9 per cent of normal; for the first half, 54.8 per cent. Normal is the average volume for the years 1928-31 inclusive.

The tonnage available for future fabrication stood in June at 575,008 tons, as against a high of 601,319 in April.

Malleable Castings Production Increases

THE Malleable Founders' Society, Cleveland, reports estimated production of malleable iron castings during the first half of 1937, of approximately 393,000 tons, which represents 73 per cent of capacity. This is an increase of about 67,000 tons or 29 per cent, over the first half of 1936.

In 1936 a total of 56 per cent of the entire output of the malleable iron industry went into the production of automobiles and trucks. Approximately 150 lb. of malleable iron castings were used in the construction of the average automotive vehicle.

During the 10-year period of 1926-1936, castings devoted to miscellaneous uses rose from 30 per cent to 37 per cent of the total production. Numerous new uses and specialty developments have been largely responsible for this increase.

New York City Department of Sanitation has awarded to Worthington Pump & Machinery Corp., Harrison, N. J., a contract for pumps and gas engines for the Tallman's Island sewage treatment works, totaling $469,000.

CIO Charged with Bad Faith in Calling Heppenstall Strike

PITTSBURGH, Aug. 2.—In a statement today, C. W. Heppenstall, president, Heppenstall Co., said the company would not agree to a consent election by the National Labor Relations Board at this time because impartial balloting would be impossible.

The Heppenstall plant has been closed since July 12 and, according to present plans, it will remain closed indefinitely while the impasse continues with the CIO over recognition. Only a few men are remaining in the plant to protect the property.

Mr. Heppenstall's statement follows:

"The company has always in the past dealt individually and collectively with its employees.

"When the strike was called, the company was bargaining collectively with the CIO, which claimed a majority of our employees. At 12:15 p. m., Monday, July 12, the CIO requested a conference to take place at the company office; the company agreed and the time of this conference was set for 2:00 p. m. the same day.

"The purpose of the conference was to arrange an election (under the supervision of the National Labor Relations Board) to which the company and the CIO had mutually agreed. Representatives of the company, CIO, and a representative of the National Labor Relations Board attended. No impasse of any nature was reached during the conference; all points discussed, prior to the time of interruption, were agreed upon amicably.

"The conference was then interrupted at 2:40 p. m. by a telephone message received in the company offices reporting the fact that pickets were preventing workmen from entering the plant.

"Company representatives asked CIO representatives if they had any knowledge of this action. CIO representatives admitted that the strike was authorized and called before the request for the conference was made.

"The company told those attending the conference that all negotiations would be cancelled and withdrawn unless picketing was immediately stopped. Picketing has continued and negotiations have stopped. All operations in the plant ceased at 3:15 p. m., Monday, July 12.

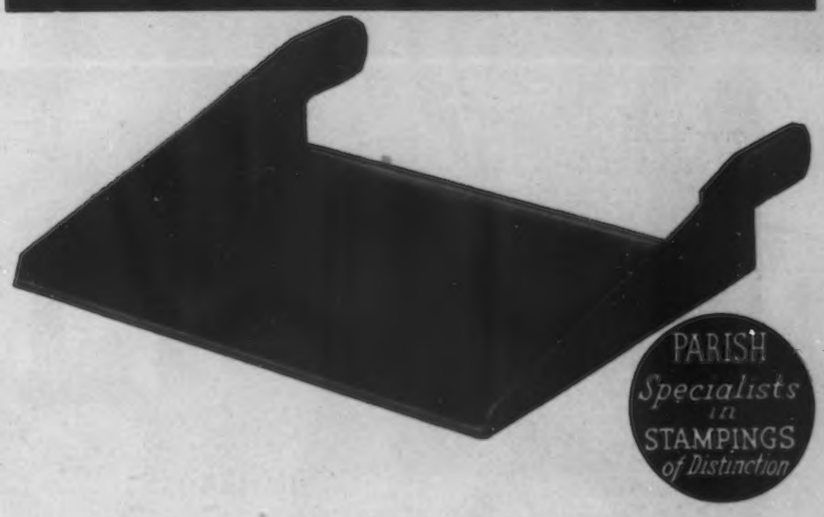
"The company believes that the CIO acted in bad faith when it called the strike while peaceful negotiations were in progress.

"The company will not at the present time agree to a consent election. The calling of the strike, causing aroused sympathies on both sides of the controversy, makes impartial balloting impossible.

"The company will continue to bargain individually and collectively with its employees."

Ford Motor Co. has awarded a contract to the Rust Furnace Co., Pittsburgh, for a slab-heating furnace for the hot-strip mill at Detroit. The furnace will have a capacity of 30 gross tons of cold steel per hour and an effective length of 45 ft. and an inside width of 17 ft. It is designed to operate on oil with coke oven gas as a standby fuel.

HE WANTED IMPROVEMENT



THE inclinator step illustrated is of pressed steel 1/8" thick; 15" x 15 1/2" x 3 3/8" high. The welded end lugs provide the necessary strength, at less cost than is feasible by any other method.

This is typical of what Parish engineers are able to accomplish, by a skillful combination of stamping and welding, to provide better parts of improved appearance and lowered final cost.

Whether the stamping be simple or complicated, large or small, complete as it comes from the press or involving building up thru other operations, we welcome the opportunity to discuss the problem with you.

PARISH PRESSED STEEL CO., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

Wage and Hour Bill May Have Rough Sledding in the House

WASHINGTON, Aug. 3.—The Adminstration's wage and hour bill, passed in the Senate by a vote of 56 to 28 after receiving the half-hearted blessing of AFL President William Green, faces the toughest battle of its life in the House, where many of its most controversial provisions have rocked the House Labor Committee for weeks.

Under the chairmanship of Mary T. Norton, Democrat, of New Jersey, who succeeded the late William Connery, of Massachusetts, the House committee has wrangled over the bill, reinserted the controversial wage and hour provisions covering wages up to 70c. an hr. and hours down to 35 per week, and has denied repeatedly that it is trying to shelve the measure for this session.

But at the same time the committee has insisted in including the very provisions whose elimination from the Senate draft, many believe, enabled the bill to pass. A number of House members from the South already have announced their intentions of vigorously opposing the House version of the bill as "far more objectionable" than the Senate draft; and the measure is expected to meet other snags perhaps in the Rules Committee where it must go before being reported to the House floor.

After once reaching the floor, the bill will undoubtedly split the Democratic ranks just as it did in the Senate when 22 Democrats joined with 17 Republicans in voting to recommit the bill. Opposition from the South has been growing ever since the bill was first introduced. A strong movement has been reported under way in Alabama to defeat Hugo Black, Senate sponsor of the bill, who is up for reelection in November.

House sponsors must also face the open hostility to the measure voiced by the metal and building trades, both powerful divisions of the AFL. Their entrance into the picture was considered significant especially since William Green's qualified indorsement of the bill frankly admitted the Senate draft "does not meet the expectations of labor."

His carefully worded statement,

INSCRUTABLE, deep-brooding silhouettes
Of massive structures, domes, and minarets
Impinge their blackness 'gainst the fleecy clouds
Like fabled monsters garbed in sable shrouds.

EMOTIONS that pulsate with vivid life
Within their confines in the daily strife
Have hushed—or vanished with the fading light
. . . In deference to black-winged, regal Night.

REFULGENT Luna—and the Milky Way—
Relieves Night's darkness in her queenly sway;
Life's fevered tempo swings to slower beat
. . . As Morpheus grants the balm of slumber sweet.

J. M, M.

which concluded with the "hope" that the House would make the bill "more nearly satisfactory and acceptable to labor," was regarded in some quarters as the result of White House prodding. Green had called on the President only the day previously. Significantly John L. Lewis has not been consulted by the President on the bill since Lewis' lukewarm indorsement of the original bill before the Joint Committee on Labor.

As passed by the Senate, the measure differed only slightly from the draft reported out by the Senate Education and Labor Committee. Power to fix wages up to 40c. per hr. and maximum hours down to 40 per week remained intact, but the Senate substituted the Wheeler-Johnson child labor bill, which would combine the flat prohibition with a provision restraining employers of child labor from shipping goods into a State in violation of that State's laws.

Many Exemptions

Perhaps the most significant changes made by the Senate was the greatly increased list of employees to be exempted from the wage-hour provisions. Some sources regard this exemption list as typical of what the Labor Standards Board will face if and when such a board is put into existence—increased pressure to exempt more and more groups with the result that the law would be of such doubtful value as to make its existence wholly unjustified. Or the board could go to the other extreme, it is pointed out, and set up such a flowering bureaucracy that other Governmental bodies would be put in the shade. Veteran observers regard the second course as the more likely but agree that in either case the taxpayers would suffer.

Speculation is rife as to why the Senate made no move to simplify the extensive administrative machinery which would be established and which has been severely criticized as top-heavy and described as a "bureaucracy of discretion." Critics point out that not a single so-called "simplification" revision has been productive of a parallel reduction in the administrative set-up provided for in the measure.

The bill would have little effect on the steel industry except perhaps in the South. Except for a section of common labor there, the wages paid are well over the 40c. minimum prescribed in the Senate draft. The Department of Labor figures for April showed an average wage of 85c. per hr. for the steel industry while standards for the metal working and foundry industries are much above requirements

ALWAYS A STEP AHEAD

STEEL production today tends steadily toward much more finished forms and larger sizes in sheets and strips, and generally speaking, the amount of handling has increased several times faster than has the tonnage.

All of this new handling is, strictly speaking, part of the production process, and has brought the Continuous Flow Principle into the foreground of the industry's thinking.

The Continuous Flow Principle is now seen to be the most important essential in materials handling in order to lower costs, get out the increased volume and finally to meet the demands of buyers for variety and finish in sheets, strips, shapes, rods, pipe and tubes.

But Continuous Flow Production is an old story to Mathews engineers —thirty-two years old. Mathews pioneered the idea of Continuous Flow based upon logical sequence of processes. And because Mathews equipment had such an early start and has kept abreast of industry, it not only includes every type needed, but also anticipates tomorrow's demands.

Processing Equipment installed during 1936-37, embracing the ultimate in design and engineering in the Steel Industry, is illustrated and described in our catalog on Steel Plant Conveyers. Available now.

The leaders in this industry, responsible for 85% of steel production in the United States and Canada, are applying the Continuous Flow Principle of Handling Materials.

MATHEWS CONVEYER COMPANY 114 TENTH STREET, ELLWOOD CITY, PENNA.

MATHEWS

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS

of that bill. Yet committees can be set up to police all industries.

While its passage in the Senate has raised the hopes of its sponsors, the opinion prevails among many that the measure is destined for ultimate failure. Supporters of the measure, however, predict its passage. Opposition from Southern interests, indifference and outright hostility from certain labor groups, either reason, many believe, is sufficient to kill the bill. A combination of the two would seem to indicate certain defeat.

Wide Differences in Bids on Steel Bars

SAN FRANCISCO, Aug. 3.—Over $100,000 separated the highest and lowest of six bidders for 6575 tons of round and square bars opened by United States Engineer's office at Los Angeles on Aug. 2. This 36 per cent competitive range is considered to have been induced by extreme desire for tonnage by Western sales departments at this time.

Sheffield Steel Corp. was low at $277,657. Five other complete bids were opened as follows: Soule Steel Co., $354,869; Truscon Steel Co., $369,619; Republic Steel Corp., $371,138; Ceco Steel Products, $377,605; Blue Diamond Corp., $378,844.

Most of the tonnage was ¾-in. round bars with additional specifications for other sizes from ½ in. to 1 in. and less than 400 tons of square bars.

. . TRADE NOTES . .

American Engineering Co., Philadelphia, manufacturer of Taylor stokers and Lo-Hed hoists, has appointed the Sabin Engineering Co., Euclid Sixty-first Building, Cleveland, as its representative in that territory for the sale of hoists.

National Tool Co., Cleveland, has opened a new sales office in Chicago at 9 South Clinton Street in charge of S. J. Burdick as sales manager. This company has moved its Detroit sales office to 417 Stormfeltz-Lovely Building from the General Motors Building and has added H. G. Allen to its Detroit sales staff. E. G. Hardig is its Detroit branch manager.

Western Iron & Steel Co., Dayton, Ohio, dealer in sheet steel, has moved to new and larger quarters at 553 Springfield Street.

Sistersville Tank & Boiler Works, Sisterville, W. Va., steel plate fabricator, has established an Eastern sales office at 92 Liberty Street, New York.

W. H. Nicholson & Co., Wilkes-Barre, Pa., has appointed Bradshaw & Co., 530 Fourth Avenue, Pittsburgh, exclusive representatives in the Pittsburgh territory on their lever, foot, solenoid, and motor operated three and four-way valves. Heretofore they handled only the four types of steam traps made by this company. A. M. Seymour, 29 Hillsboro Road, Rochester, N. Y., has been appointed representative in the Rochester-Syracuse territory on the complete line.

Lincoln Electric Co., Cleveland, is opening a new sales engineering office at Dayton, Ohio. The office, located at 1508 Watervliet Avenue, will be in charge of R. P. Sharer.

Koppers Co. Books Large Contracts

A CHEMICAL plant, a gas utility and two jobs for a Government dam are represented in four new contracts, totaling $1,592,000, just awarded to Koppers Co.'s Bartlett Hayward division, Baltimore.

For the Davison Chemical Corp.'s Curtis Bay plant, the Koppers Co. contract calls for new machinery to produce granulated superphosphate and mixed fertilizers, buildings for the storage of bulk and bagged material, machinery for screening, conveying and mechanical loading of railroad cars, and alterations to the materials handling system for the unloading and storage of rock and other products.

The gas production capacity will be increased at the East station of the Washington Gas Light Co., Washington. This work will consist of an extension to the generator house and the installation of a 12-ft. diameter Koppers Western A.B.C. mechanical grate generator, with an 11-ft. diameter carbureter and superheater of considerably greater height than normal.

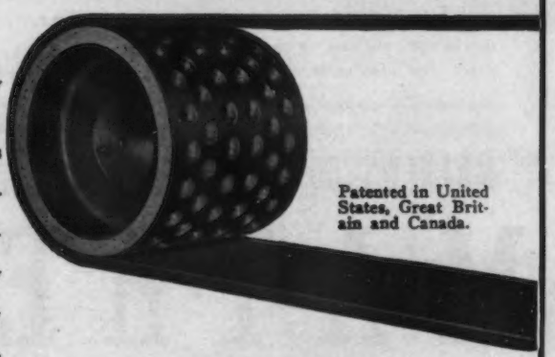
Twelve 102-in. diameter cast-iron Paradox gates and conduit linings are being built for the Marshall Ford dam at Rutledge, Texas. Each gate weighs 100 tons and each set of conduit linings weighs 50 tons. For the same dam the Koppers Co. has a contract for 24 bulkhead gate frame and track assemblies for outlet works. This includes about 230 tons of bronze castings which will be made in the Bartlett Hayward division's foundry.

Scientific solutions to basic problems in valuation and depreciation estimating, based on innumerable life experience tables, are offered by Dr. E. B. Kurtz, professor of the Electrical Engineering Department, State University of Iowa, in his recently published book, "The Science of Valuation and Depreciation." Dr. Kurtz thoroughly covers the subject of replacement insurance, life characteristics, life expectancy and annual renewals.

This Pulley Revolutionized FLAT BELT Performance...

TEN BIG POINTS

1 Belt slippage eliminated.
2 Belt sealed to pulley by Vacuum Cups.
3 Belt "slap" eliminated.
4 Tight stretching of belts unnecessary.
5 Life of belt greatly increased.
6 Use of belt dressing unnecessary.
7 Production noticeably stepped up.
8 No power loss on heavy shock loads.
9 No pulley maintenance expense.
10 Vacuum Cup Pulleys never wear out



Patented in United States, Great Britain and Canada.

Pick out your toughest job and order a pulley on our 30-Day Free Trial Offer

VACUUM CUP METAL PULLEY CO., INC.
1010 FORD BLDG. DETROIT, MICH.
"A Belt Never Squealed on a Vacuum Cup Pulley"

Republic Steel Denies NLRB Charges of Unfair Practices

CLEVELAND, Aug. 3.—Republic Steel Corporation today filed with the National Labor Relations Board's regional office in Cleveland its answer to the complaint made by the board based upon charges placed by the Steel Workers Organizing Committee. It emphatically denied that Republic has engaged in and is engaging in any unfair labor practices affecting commerce as set forth and defined in the National Labor Relations Act, and denied that the NLRB has issued complaint pursuant to and in accordance with any power vested in it by the provisions of the act.

Listing the many complaints made by the NLRB, Republic in practically every instance denied each and every allegation. In summation, the Cleveland company moved that the entire complaint should be dismissed for the following reasons:

"(A) Because none of the alleged unfair labor practices complained of affected production, manufacture, sale, or distribution; nor affected, burdened or obstructed the flow of Republic's products; nor affected, burdened or obstructed the flow of interstate or foreign commerce, or tended to do so; (B) because none of the acts complained of interfered with Republic's operations nor caused a labor dispute nor affected interstate or foreign commerce; (C) because none of the acts complained of tended to lead to a labor dispute, nor to burden or obstruct commerce and the free flow of commerce between the various states of the United States and/or foreign countries; (D) because none of the persons mentioned in said complaint were engaged in interstate commerce; (E) because the NLRB does not prohibit the normal exercise of the right of Republic Steel to select its employees, to lay them off or to discharge them; and further if construed to do so, it is in violation of the Constitution of the United States, and because any and all terminations of employment of any and all former employee or employees of Republic Steel Corp. were lawful and for business reasons; (F) because the Constitution of the United States does not permit Congress or the NLRB to regulate the dealing between Republic and its employees where such employees are engaged in the purely local business of manufacture or production; (G) because the issuance of such complaint, the facts and circumstances surrounding the same and under which said complaint was issued, the obvious purpose and intent for which said complaint was filed and the method of conducting proceedings and the procedure thereunder, all constitute a denial to Republic of due process of law and the violation of the rights of Republic guaranteed to it under the provisions of the Constitution of the United States; (H) because the SWOC, which filed the charges upon which the complaint is predicated, is not a labor organization as defined by Sec. 2, Subdivision 5, of the National Labor Relations Act, and therefore, is altogether without power or authority to file any charges whatsoever against Republic; (I) because the NLRB is altogether without jurisdiction to consider or determine the charges set forth in the complaint herein or to file the said complaint, for the following reasons—the National Labor Relations Act, pursuant to which the NLRB was created and vested with certain jurisdiction, power and authority, is altogether void and of no validity in law, as construed and applied by the NLRB because its terms and provisions, if enforced, would deprive employers, sought to be made subject to its terms, of due process of law, in violation of the fifth amendment to the Constitution of the United States, in this, to wit: It gives to an employee the right to file with the board charges against his employer and provides for a hearing thereof and action thereon against the employer by the board or the courts of the United States, without giving to the employer a similar or corresponding right against his employee. It provides for a hearing of the charges so filed by an employee against his employer by the board or, in the first instance, by an agent or agency designated by the board, with no restriction or limitation whatsoever as to the kind or character of evidence to be considered by the board in support of or in answer to such charges, but upon the express condition that the findings of the board as to the facts, if supported by evidence, shall be conclusive in the premises."

Wheeling Steel Wage at Portsmouth Raised

FOLLOWING a pay adjustment at its Portsmouth, Ohio, works the minimum hourly rate at all plants of the Wheeling Steel Corp. becomes 62½c. an hr., or $5 a day. The Portsmouth rate was lower because of the geographical differences originally set up in the NRA code days. Approximately 1600 employees are affected by the revision in wages, which also takes care of an increase for some employees just above the common labor classification.

Ingot Production At Detroit Lower

DETROIT ingot production, which has been running 100 per cent almost continuously for months, falls this week to 90 per cent. Both at Ford Motor Co. and at Great Lakes Steel Corp., Ecorse, it was reported that repairs had necessitated curtailment, closing down one furnace at each plant. Both are expected to be ready for use early next week.

Italy's Steel Output Rising

LONDON (*Special Correspondence*).—Italy's pig iron output in May last is officially announced as 70,200 tons, against 61,100 tons in April and 70,800 tons in May, 1936.

For the first five months of the current year the production was 286,700 tons, compared with 318,800 tons in the same period of 1936.

Steel output in May was 193,600 tons, against 188,400 tons in the preceding month and 177,400 tons in May, 1936. For the first five months production was 882,700 tons (against 864,400 tons in the same period of 1936).

Pittsburgh Steel Acquires 2 Mines

THE Pittsburgh Steel Co., Pittsburgh, has purchased the Thompson No. 1 and 2 and Tower Hill No. 2 mines from the Hecla Coal & Coke Company in the Brownsville, Pa., region.

Republic to Increase Youngstown Capacity

IMPROVEMENTS involving an investment of about $750,000 in the Youngstown plants of Republic Steel Corp. were announced on Saturday by company officials.

Included in the major improvements are the rebuilding and enlarging of No. 3 blast furnace, increasing the daily capacity of the stack from 500 to 825 tons; installation of a new heating furnace and other improvements in the 10-in. skelp mill bessemer plant, increasing the capacity by 3000 tons per month; and improvements for finishing pipe in the electric weld tube mills.

The structure of the No. 3 blast furnace is being built to permit an additional increase in capacity to 1000 tons per day at a later date.

Continental Can To Spend $10,000,000

CONTINENTAL CAN CO., which has engaged in extensive plant modernization and expansion during the past year or two, will require additional working capital to continue this program, which will cost $10,000,000 for completion. To raise this money the stockholders will be asked to ratify an issue of 350,000 shares of preferred stock at a meeting called for Sept. 28. New container plants will be built at various locations, including, St. Laurent, Canada; Malden, Mass.; Tampa, Fla., and Stockton, Calif. An additional plant at Camden, N. J., will be equipped.

Speed Determines Errors In Loading

ERRORS in loads indicated by testing machines used in determining the strength of structural materials have been the subject of a study by the United States Bureau of Standards recently. The bureau contends that these errors depend to a certain extent upon the rate at which the load is applied to the test specimen. That is, the errors shown by the use of dead weights, proving levers, or elastic calibrating devices when the machine is used at constant or slowly increasing test loads are not the same as those resulting from a rapid loading of a test specimen to the point of failure.

Since the last-named test procedure is often used in practice, Bruce Wilson and Carl Johnson of the National Bureau of Standards have been studying the errors of typical testing machines under rapidly increasing loads, simulating conditions often encountered in actual service.

The errors, due to rate of loading, of six testing machines, comprising four types widely used in this country, were determined by means of a special elastic calibrating device for rates of loading up to 50,000 lb. per min. The testing machines calibrated, included one beam and poise, screw-driven machine; two pendulum, hydraulic machines; one spring, hydraulic machine; and two Bourdon-tube, hydraulic machines.

The additional errors of the indicated loads of these machines, due to rate of loading, at rates currently used in testing, exceeded in several cases the tolerance of 1 per cent which is specified for such machines. These errors, therefore, cannot in general be neglected when determining the rates of loading to be used in materials testing.

For all machines which showed an effect, except the beam and poise, screw-driven machine, the indicated load was less than the applied load. For the beam and poise, screw-driven machine the indicated load was greater than the applied load.

Messrs. Wilson and Johnson point out that although the results of these tests cannot be used to correct the indicated loads of other testing machines of the same types because of small inherent differences in the weighing systems and slight differences of adjustment, they should prove useful as indicating the magnitude of the errors to be expected.

Port Huron-Sarnia Bridge Bids Opened

DETROIT, Aug. 3.—The American Bridge Co. and the Wisconsin Bridge Co. were apparently low bidders on the main span and American approach respectively for the International Bridge across the St. Clair River between Port Huron, Mich., and Port Edward (Sarnia), Ont., it was revealed today. Figures submitted to the Michigan Bridge Commission were $767,279.39 for the main span and $386,575.90 for the approach. In the main section, 4950 tons of structural steel and steel flooring are involved. The approach requires 2400 tons of structural steel. The overall length of the bridge is to be 6535 ft., with an 871-ft. cantilever center section. The American approach is 2280 ft. and the Canadian approach is 2657 ft. Water clearance is 150 ft. Bids on the Canadian part of the job are in Toronto and will be opened this week.

Allis-Chalmers Mfg. Co., Milwaukee, is successful bidder at $1,080,269 for furnishing two vertical shaft 115,000-hp. turbines and two governors to the United States Government for installation at the Boulder Dam generating plant. Four units of similar size already have been purchased from Allis-Chalmers. Company is also low bidder at $650,000 on 11 large transformers required by the City of Los Angeles for distribution of Boulder Dam power. Allis-Chalmers already has furnished the city of Los Angeles 14 transformers for similar use at a cost of approximately $1,000,000.

FINANCIAL NOTES

U. S. Pipe & Foundry Co.'s profits for 12 months ended June 30, after depreciation, estimated Federal income taxes, etc., but before the surtax on undistributed profits, amounted to $2,585,488, equal to $3.72 a share on 695,120 shares of common stock. Profits in a similar period in 1936, after deductions noted above, but before the undistributed profits surtax, were $1,899,974. After allowances for preferred stock then outstanding but since retired, this equaled $2.47 a share on 600,000 shares of common stock.

Youngstown Sheet & Tube Co. has called for redemption on Aug. 25, 1937, all of its 3½ per cent convertible debentures still remaining outstanding, amounting to approximately $5,200,000, at par and accrued interest plus a premium of 4 per cent. On or before Aug. 25, the debentures called may be converted into common shares, on the basis of 16 common shares for each $1,000 debenture, subject to adjustment for dividends and interest as provided in the indenture. The debentures called are the last of a $30,000,000 issue made Feb. 1, 1936, as part of a refinancing program of the company.

Pittsburgh Screw & Bolt Corp., for the quarter ended June 30, shows net profit of $472,814 after depreciation, interest and Federal and state income taxes, but before the surtax on undistributed profits, etc. This compares with net profit of $517,523 in the preceding quarter and $336,466 in the second quarter of 1936. For six months ended June 30, 1937, the company shows net profit of $990,337.

Harbison-Walker Refractories Co., Pittsburgh, reports for the quarter ended June 30 estimated net earnings, including subsidiaries, of $921,300, equivalent after dividend requirements on the preferred stock to 64c. per share on 1,358,883 shares of common stock, compared with $807,700, or 55c. a common share in the June quarter of 1936. For the first six months of 1937 estimated net earnings were $2,013,100, compared with $1,348,800 in the 1936 period. No provision is made for any undistributed profits tax. For 12 months ended June 30, 1937, net was $4,126,700, compared with $2,370,700 for 12 months ended June 30, 1936.

Sales billed by **General Electric Co.** during the first six months of 1937 amounted to $171,076,645, compared with $119,273,388 during the corresponding period of 1936, an increase of 43 per cent, President Gerard Swope has announced. Profit available for dividends for the first six months this year amounted to $26,293,604, compared with $16,592,324 for the first six months last year, an increase of 58 per cent. This six months' profit is equivalent to 91c. a share of common stock, compared with 58c. a share in the same period last year.

July Pig Iron Output Up Almost Nine Per Cent In Daily Rate

PRODUCTION of coke pig iron in July, at 3,498,858 gross tons, compares with 3,107,506 in June. The daily rate last month rose almost 9 per cent over that in June, or from 103,584 to 112,866 tons, which was almost up to the rate which prevailed before the strikes in May.

There was a net gain of 11 furnaces making iron on Aug. 1, the 192 furnaces operating at the rate of 115,445 tons daily, against 181 on July 1, producing 105,975 tons daily. Fifteen furnaces were blown in during the month and four were blown out or banked. The United States Steel Corp. put on one furnace and took one off blast, independent producers blew in 12 and took three off blast and merchant producers blew in two furnaces.

Among the furnaces blown in were the following: One Clairton, Carnegie-Illinois Steel Corp.; one Haselton, four River, one Betty, Republic Steel Corp.; one Martin's Ferry, Wheeling Steel Corp.; two South Chicago and one Indiana Harbor, Youngstown Sheet & Tube Co.; two Madeline, Inland Steel Co.; one Mary, Sharon Steel Corp.; and the Jisco furnace of the Globe Iron Co.

Furnaces blown out or banked included a Susquehanna unit of the National Steel Corp., a Cambria furnace of Bethlehem Steel Corp., a Lorain furnace of the National Tube Co., and an Aliquippa furnace of the Jones & Laughlin Steel Corp.

The number of available furnaces making pig iron has been reduced from 240 to 238 by the dismantling of the Lucy furnaces of the Carnegie-Illinois Steel Corp.

Daily Average Production of Coke Pig Iron

Gross Tons

	1937	1936	1935	1934	1933
January	103,597	65,351	47,656	39,201	18,348
February	107,115	62,886	57,448	45,131	19,798
March	111,596	65,816	57,098	52,243	17,484
April	113,055	80,125	55,449	57,561	20,787
May	114,104	85,432	55,713	65,900	28,621
June	103,584	86,208	51,570	64,328	42,166
½ year	108,876	74,331	54,138	54,134	24,536
July	112,866	83,686	49,041	39,510	57,831
August	.....	87,475	56,816	34,012	59,142
September	.....	91,010	59,216	29,935	50,742
October	.....	96,512	63,320	30,679	43,754
November	.....	98,246	63,364	31,898	36,174
December	.....	100,435	67,950	33,149	38,131
Year	.....	83,658	67,556	43,592	26,199

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1937	1936	1937	1936
January	3,211,500	2,025,885	23,060	24,766
February	2,999,318	1,823,706	24,328	24,988
March	3,459,473	2,040,311	27,757	32,725
April	3,391,665	2,403,683	26,765	19,667
May	3,537,231	2,648,401	34,632	18,363
June	3,107,506	2,586,240	34,415	17,549
½ year	19,706,593	13,528,226	170,857	128,058
July	3,498,858	2,594,268	23,913	20,205
August	.....	2,711,721	.....	20,658
September	.....	2,730,293	.....	15,919
October	.....	2,991,887	.....	19,806
November	.....	2,947,365	.....	24,368
December	.....	3,115,037	.....	25,715
Year	.....	30,618,797	.....	254,728

This market has not yet recovered from dullness, only one pending project, 200 tons for Detroit to be bid Aug. 5, and no awards being reported. Sellers are not optimistic over the immediate future of their business since the normal pipe buying season is about over.

Production by Districts and Coke Furnaces in Blast

Furnaces	(Gross Tons) Production July (31 Days)	(Gross Tons) Production June (30 Days)	Aug. 1 Number in Blast	Aug. 1 Operating Rate, Tons a Day	July 1 Number in Blast	July 1 Operating Rate, Tons a Day
New York:						
Buffalo	238,374	232,868	11	7,600	12	7,840
Other New York and Mass.	40,583	39,999	3	1,310	3	1,335
Pennsylvania:						
Lehigh Valley	83,133	83,811	6	2,710	6	2,795
Schuylkill Valley	43,576	37,409	3	1,405	3	1,245
Susquehanna and Lebanon Valleys	40,446	38,300	2	1,305	2	1,275
Ferromanganese	.....	.....	0	....	0	....
Pittsburgh District	794,715	777,282	38	26,140	38	25,795
Ferro. and Spiegel	19,331	25,367	3	625	3	845
Shenango Valley	70,470	69,682	4	2,275	4	2,325
Western Pennsylvania	88,909	66,701	6	2,870	7	2,225
Ferro. and Spiegel	9,183	10,884	2	295	2	365
Maryland	142,828	132,632	6	4,605	6	4,655
Wheeling District	165,593	157,803	8	5,510	7	5,260
Ohio:						
Mahoning Valley	354,266	152,736	18	11,430	16	7,355
Central and Northern	254,238	223,273	16	9,185	12	7,440
Southern	47,552	45,724	4	1,595	3	1,525
Illinois and Indiana	681,426	616,003	31	23,095	26	19,860
Michigan and Minnesota	103,125	100,129	6	3,325	6	3,340
Colorado, Missouri and Utah	50,499	58,119	3	1,385	4	1,935
Ferromanganese	1,471	.....	1	95	0	....
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	2,818	2,710	1	90	1	90
Kentucky	27,659	26,514	2	895	2	885
Alabama	235,253	203,714	17	7,590	17	7,425
Ferro. and Spiegel	3,380	4,786	1	110	1	160
Tennessee	.....	1,060	0	....	0	....
Total	3,498,858	3,107,506	192	115,445	181	105,975

New Ship Program To Be Launched

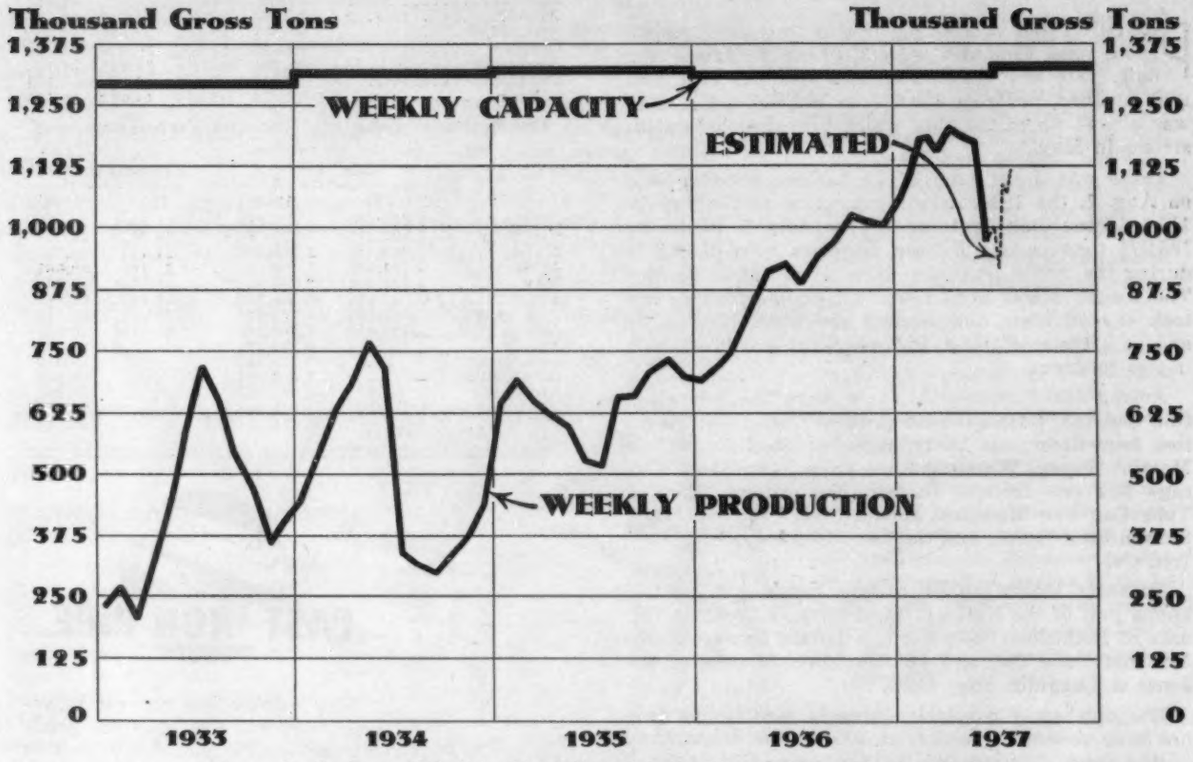
WASHINGTON, Aug. 3.—It is estimated that between 10,000 and 12,000 tons of steel will be required for construction of the 34,000 ton ship to be designed by the United States Maritime Commission and to be built for the United States Lines. Bids will be opened at the offices of the commission in Washington on Sept. 12.

The vessel will replace the Leviathan, which was withdrawn from service two years ago.

A sizable steel tonnage also will be required for six naval auxiliaries provided for in a bill signed yesterday by the President, The vessels will cost a total of about $49,000,000. They consist of one each of the following types: Destroyer tender, mine sweeper, fleet tug, tanker, submarine tender and aircraft tender.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	84.0	85.0
Chicago	85.0	85.0
Valleys	85.0	78.0
Philadelphia	71.0	72.0
Cleveland	83.0	82.0
Buffalo	88.5	88.5
Wheeling	95.0	95.0
Southern	76.5	76.5
Ohio River	91.5	89.5
Western	95.0	95.0
St. Louis	76.5	84.5
Detroit	90.0	95.0
Eastern	70.0	98.0
Aggregate	85.0	85.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Aug. 3, 1937	July 27, 1937	July 7, 1937	Aug. 4, 1936	1937	1936
Fabricated structural steel awards	13,000	22,300	16,500	15,000	720,040	669,335
Fabricated plate awards	1,820	1,310	595	685	66,125	169,260
Steel sheet piling awards	0	0	0	275	35,555	33,975
Reinforcing bar awards	13,820	7,555	7,400	9,750	162,190	226,980
Total Lettings of Construction Steel	28,640	31,165	24,495	25,710	983,910	1,099,550

. . . SUMMARY OF THE WEEK. . . .

. . . Backlogs declining but production continues at 85 per cent.

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. . . Railroad equipment inquiries, both domestic and foreign, appear.

o o o

. . . Pig iron output gains 9 per cent in July; scrap prices go higher.

STEEL companies' backlogs of orders are steadily declining, affording better deliveries to customers, but are still substantial enough to assure a continued high rate of production through August, particularly if the expected upturn in buying for autumn requirements gets under way this month, of which there are already scattered indications. A leading Chicago producer, for example, has booked the largest volume of new business in four weeks, largely a reflection of the outstanding activity in farm machinery and equipment.

The automobile industry, slower than expected in making volume purchases for 1938 models, will come into the market in a bigger way within the next two or three weeks, perhaps ushering in the fall buying movement for industry generally. With automobile buying at a minimum, total volume of new steel business is running considerably behind shipments.

An unexpected development at this time is the appearance of new inquiries for railroad equipment, both domestic and foreign, perhaps the forerunner of a secondary buying movement by the railroads. It was thought that the pending wage controversy and the failure of the Interstate Commerce Commission to announce a decision on freight rate advances might postpone additional equipment purchases until late in the year, but the roads are faced with an autumn traffic volume that may tax their facilities. While new purchases now would not relieve a possible car shortage this fall, the equipment would be received in time to replace cars that might get into bad order from excessive usage. A number of car shops are in position to take on new work almost immediately.

The largest domestic railroad inquiry is from the Texas & Pacific for 500 to 1000 box cars and 100 hopper cars. The Cambria & Indiana is in the market for 500 cars, the Virginian will rebuild 1000 gondola cars of large capacity in its own shops, and the Peoria & Pekin Union has ordered 50 cars. Export inquiry includes 45 locomotives for the South African Railways, while an order for 500 steel box cars has been placed here by the Sorocabana Railways of Brazil.

Foreign inquiry for steel is showing renewed signs of life. Countries such as Greece and Turkey, which usually buy from Germany, are looking to this country. British mills have bought 100,000 tons of semi-finished steel on the Continent, but still haven't enough to supply their needs, with their finished steel output sold to the end of the year. Some business in semi-finished and finished steel has been negotiated here for Britain at our domestic prices.

THE domestic steel situation continues to show the contrary trends of recent weeks—the smallest volume of new business in many months, a high rate of steel production and an excited and steadily advancing scrap market, which in the past week has received impetus from a larger volume of steel mill purchases.

Ingot production is estimated at 85 per cent, unchanged from last week. There has been a sharp increase in the Youngstown area, from 78 per cent to 85 per cent, and a gain of one point in the Cleveland-Lorain area, both districts showing that difficulties resulting from recent strikes have been overcome. The Pittsburgh operating rate is down one point to 84 per cent, Chicago is holding steadily, as are most other districts except Detroit, where operations have declined from 100 to 90 per cent, and St. Louis, where a decline of several points has occurred.

Scrap dealers are scouring the country for material and frequently are bidding above the prices that mills have paid. On bids for automotive scrap in Michigan, dealers' bids showed a variation of as much as $2.50 for the same material. Advances of 50c. at Pittsburgh and Chicago and an unchanged price at Philadelphia have raised THE IRON AGE scrap composite to $20.42, within $1.50 of the year's peak and $3.34 above the June low of $17.08.

RECOVERY from steel strikes is shown by July pig iron production, which totaled 3,498,858 gross tons, against 3,107,506 tons in June, when many furnaces were idle. The daily rate of 112,866 tons in July was a gain of 9 per cent over the daily average of 103,584 tons in June, but did not quite reach the May figure of 114,104 tons, the highest for the year thus far. There was a net gain of 11 active furnaces during the month. On Aug. 1 the number in blast was 192, operating at a rate of 115,445 tons a day. All but 46 of the 238 potentially active furnaces are in service, and many of those idle are high cost units that cannot be run at a profit under present conditions. Lake Superior ore shipments last month, at 10,704,457 tons, were the third largest monthly movement and the highest July movement on record.

. . . PITTSBURGH . . .

. . . Ingot production off one point; unchanged in Wheeling area.

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. . . New business shows further decline; backlogs being reduced.

o o o

. . . Heavier buying soon by automobile companies may usher in fall upturn.

PITTSBURGH, Aug. 3. — Steel ingot production in the Pittsburgh district has moved down one point to 84 per cent of capacity, while the Wheeling rate remains unchanged at 95 per cent. Any further curtailment in production is not expected to be sharp or of long duration.

The total volume of incoming business during the past week is off some from the previous period. Producers look for no material upturn until heavier tonnages are purchased by automotive companies. Backlogs are being rapidly cleaned up on most items, and producers are able to make fairly good deliveries.

The leading producer in this district has gone along with the galvanized sheet set-up recently announced by a Southern mill. As pointed out last week, galvanized roofing and siding when purchased in 80,000 lb. lots or more for shipment at one time to one destination, carries a $3 deduction from the unchanged base price. The jobber discount of $2 a ton on flat galvanized sheets has been eliminated, and less carload extras on flat galvanized sheets have been increased 10c. per 100 lb. The new set-up is effective Oct. 1 and applies to 26 gage and lighter.

Railroad buying and inquiries have shown a slight increase in activity which may be a forerunner of larger purchases in the fall.

Tin plate production is at 100 per cent, with pressure being exerted all along the line for better deliveries.

Scrap market has shown further signs of strength, having risen 50c. a ton.

Pig Iron

Although current demand continues light owing to seasonal factors and the presence of ample stocks at some consumers' plants, shipments have subsided only a little. Heavier buying is expected within a month or so when present stocks at some consuming plants have been worked off. Producers are using the comparatively dull period to replenish depleted inventories. Carnegie-Illinois Steel Corp. has blown in a furnace at the Clairton works.

Semi-Finished Steel

Specifications booked in July were equally as good, if not better, than the volume placed in June, and the current rate of new business is unchanged from previous activity. Foreign inquiry has picked up in the past week and, aside from average tonnages which are involved, prices are being asked on a few lots requiring a substantial amount of steel.

Bolts, Nuts and Rivets

Incoming business, although slightly better in the past week, ran from 20 to 25 per cent below that booked in June. The volume of new orders will just barely sustain a 50 to 60 per cent production rate. Automobile business has been placed on the books but releases are expected some time later and the tonnages involved are not large.

Bars

July bookings of hot rolled bars were not much if any below the volume placed in June and current business is about on a par with previous activity. A substantial increase in fresh orders is expected within the coming month when support will be given to the market by automotive purchases and the resumption of buying by customers whose work has been curtailed because of seasonal factors. Fall buying by farm implement makers this year is expected to materialize sooner than is usually the case because of heavy demand for agricultural machinery.

Cold Finished Bars

July business was about 15 to 20 per cent below that booked in June and the volume of incoming orders continues light, with little chance of expansion taking place until heavier tonnages are taken by automobile companies. Although the latter have been ordering recently, tonnages involved are small. Backlogs are about cleaned up and deliveries may now be obtained in two to three weeks.

Reinforcing Bars

Awards are numerous and tonnages involved are fairly large. Outstanding award in the past week involved 1500 tons for a high school at Philadelphia and went to Sweet's Steel Co. Inquiries are out for a distillery plant at Peoria, Ill., which will require 1100 tons of reinforcing bars.

Steel Sheet Piling

Demand is light but substantial tonnages are pending. Approximately 800 tons of piling will be required for a dock wall at Chicago, and Tennessee Valley Authority is inquiring for 416 tons for a project at Knoxville, Tenn.

Plates and Shapes

Structural plate and shape specifications continue to level off and July bookings ran from 25 to 30 per cent below those placed in June. Structural inquiries and awards in the past week were not numerous. The American Bridge Co. was awarded contracts involving 1145 tons for various Pennsylvania Railroad bridges at New Brunswick, N. J.

Railroad Buying

Pressed Steel Car Co. will build 25 50-ton gondola and 25 50-ton hopper cars for Peoria & Pekin Union Railroad. The gondolas will be manufactured at Pittsburgh while the hoppers will be made at Hegewisch, Ill. Sorocabana Railway of Brazil has purchased 500 all-steel box cars from Pullman Standard Car Mfg. Co. Virginian Railway Co. will rebuild 1000 120-ton gondolas and the project will require approximately 14,000 tons of steel. Uruguayan Railways Co. has purchased 5000 tons of standard rails. It is the opinion in some

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 3, 1937	July 27, 1937	July 7, 1937	Aug. 4, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$36.37½
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	30.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	30.00
Slabs, Pittsburgh	37.00	37.00	37.00	30.00
Forging billets, Pittsburgh	43.00	43.00	43.00	37.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	1.95
Bars, Chicago	2.50	2.50	2.50	2.00
Bars, Cleveland	2.50	2.50	2.50	2.00
Bars, New York	2.78	2.78	2.78	2.30
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.53	2.53	2.53	2.19
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5025	2.5025	2.5025	2.16¼
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.25
Hot-rolled strips, Pittsburgh	2.40	2.40	2.40	1.95
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.50
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.60
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.20
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.30
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	1.95
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.05
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.05
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.15
Wire nails, Pittsburgh	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., Pittsburgh	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh	$5.35	$5.35	$5.35	$5.25

Pig Iron

Per Gross Ton:	Aug. 3, 1937	July 27, 1937	July 7, 1937	Aug. 4, 1936
No. 2, fdy., Philadelphia	$25.76	$25.76	$25.76	$21.3132
No. 2, Valley furnace	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti	23.69	23.69	23.69	20.2007
No. 2, Birmingham†	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	20.3132
Basic, Valley furnace	23.50	23.50	23.50	19.00
Malleable, Chicago*	24.00	24.00	24.00	19.50
Malleable, Valley	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, carlots	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	$21.25	$20.75	$18.75	$15.50
Heavy melting steel, Phila.	19.75	19.75	17.75	13.00
Heavy melting steel, Ch'go.	20.25	19.75	15.75	14.25
Carwheels, Chicago	19.75	19.75	18.25	15.00
Carwheels, Philadelphia	19.75	19.75	19.75	14.75
No. 1 cast, Pittsburgh	20.25	19.75	18.75	14.75
No. 1 cast, Philadelphia	20.75	20.75	20.25	15.00
No. 1 cast, Ch'go (net ton)	16.75	16.75	15.25	13.00
No. 1 RR. wrot., Phila.	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net)	19.75	19.75	14.50	13.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.35	$4.35	$4.35	$3.50
Foundry coke, prompt	5.00	5.00	5.00	4.00

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	14.00	14.00	14.00	9.75
Lake copper, New York	14.12½	14.12½	14.12½	9.87½
Tin (Straits), New York	58.875	60.375	56.375	42.00
Zinc, East St. Louis	7.00	7.00	6.75	4.80
Zinc, New York	7.85	7.35	7.10	5.17½
Lead, St. Louis	5.85	5.85	5.85	4.45
Lead, New York	6.00	6.00	6.00	4.60
Antimony (Asiatic), N. Y.	15.375	15.00	14.50	13.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Aug. 3, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$20.42 a Gross Ton
One week ago	2.605c.	23.25	20.08
One month ago	2.605c.	23.25	17.42
One year ago	2.159c.	18.84	14.25

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$17.08, June 15
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

quarters that the improvement in car inquiries is a forerunner of more active buying in the fall.

Sheets

Total sheet business in the past week was off some from the previous period and the volume of bookings placed in July was between 30 and 40 per cent below total orders in June. The rate of incoming business has changed but little in the past several weeks and is somewhat below shipments because of absence of large scale automotive buying. Backlogs have been pared down and one large interest is promising cold rolled sheets in five to six weeks, galvanized and hot rolled annealed in 17 to 18 weeks and hot rolled 16 gage and heavier in nine to 10 weeks.

Tubular Goods

Demand for oil-country goods has shown a decided improvement during the past two weeks and the trend is expected to continue as oil companies are anticipating their requirements further ahead than has been their custom. Some sources estimate that drillings during the last half of this year will be somewhat ahead of the first six months. Backlogs on oil-country goods are fully four to six weeks and the present influx of business precludes any possible chance of producers building up their badly depleted stocks either at the mill or warehouses. Standard pipe demand is still dull and bookings of boiler tubes and mechanical tubing are not impressive.

Wire Products

Aggregate wire business has shown improvement in the past week owing to better demand for wire rods and manufacturers' wire. Merchant wire specifications are still light but producers are still looking for an exceptionally heavy fall business. Although some Eastern jobbers appear to be well stocked, the reverse seems to be true of the Western and Southwestern jobbing trade, where the greatest demand will be felt because of a more expanded farm purchasing power.

Tin Plate

Tin plate operations are easily at 100 per cent and some mills continue to operate more than the normal number of turns. This condition is expected to exist for quite some time. With optimistic forecasts of larger crops being borne out and a steady increase in general line can consumption, there is little doubt that tin plate production will make another record this year.

Strip

Total strip tonnages in July were about equal to those booked in June and specifications in the past week showed no change from the previous period except that a larger proportion of incoming business emanated from automobile parts makers. New business may be roughly estimated at 70 to 75 per cent of shipments. Backlogs have been reduced considerably, with the result that deliveries may be had in two to three weeks on hot rolled and three to five on cold rolled strip. A more active strip market is expected when automobile companies get under production for 1938 models.

Coal and Coke

The beehive coke situation in the Connellsville region is taking on a stronger tone and, although accumulations exist at some plants, the major part of them have been cleaned up. Furthermore, at least 200 beehive coke ovens have resumed operations within the past two weeks. Some shipments which had been held up because of steel strikes have been resumed. A steel stack in this district, which blew out recently and which is expected to be back in operation some time this month, will require about 15,000 tons of furnace coke monthly. Practically all "captive" mines which had been closed by sympathy strikes are now in operation.

. . . Awards of 13,820 tons —14,235 tons in new projects.

AWARDS

Huntington, Mass., 165 tons, State bridge, to Truscon Steel Co.

New Britain, Conn., 100 tons, Landers, Frary & Clark plant, to Bethlehem Steel Co.

New York, 480 tons, anchorages, Bronx-Whitestone Bridge, to Fireproof Products Co., New York, through Corbetta Construction Co., New York.

New York, 420 tons, Ditmars Avenue sewer, to Capitol Steel Corp., Brooklyn.

Newark, N. J., 500 tons, edible oil and shortening plant, Swift & Co., to Joseph T. Ryerson & Son, Inc.

Weehawken, N. J., 1200 tons, New Jersey approach, Lincoln Tunnel, to Igoe Brothers, Newark.

Perth Amboy, N. J., 450 tons, by-pass, to Truscon Steel Co.; P. Camillo & Co., Westfield, N. J., general contractor.

Lehigh County, Pa., 170 tons, State highway, C. W. Good, general contractor, to Bethlehem Steel Co.

Philadelphia, 1500 tons, Academic high school, to Sweets Steel Co.

Philadelphia, 115 tons, St. Vincent's Hospital, to American Steel Engineering Co.

Wilmington, Del., 100 tons, bridge, William H. Francis, general contractor, to Bethlehem Steel Co.

Richmond, Va., 1000 tons, factory building, Phillip Morris & Co., to Virginia Steel Co.

Clarksburg, W. Va., 110 tons, Sycamore Street bridge, to Ben Tom Supply Co.

Louisville, 300 tons, bottling plant, Bernheim Distillery, to Inland Steel Co.

Chicago, 200 tons, building, to Calumet Steel Co.

Chicago, 1900 tons, post office garage, to Inland Steel Co.

South Chicago, 500 tons, grain elevator, to Calumet Steel Co.

New Orleans, 1510 tons, Charity hospital, to Connors Steel Co., Birmingham.

Phoenix, Ariz., 667 tons, Salt River project, to Colorado Fuel & Iron Co.

Fresno, Mont., 288 tons, two invitations for Chain Lakes project, to Northwest Steel Co.

Casper, Wyo., 106 tons, Casper-Alcova project, to Colorado Fuel & Iron Co.

Calexico, Cal., 240 tons, All-American Canal project, to Concrete Engineering Co.

San Francisco, 1800 tons, Sunset Reservoir, to Concrete Engineering Co.

NEW REINFORCING BAR PROJECTS

Boston, 188 tons, Huntington Avenue underpass.

Willimantic, Conn., 148 tons, grade crossing.

New York, 150 tons, Brook Avenue bridge, between East 134 and East 135 Streets.

Queens, N. Y., 800 tons, sewers, two contracts.

Buffalo, 50 to 150 tons, section of Buffalo sewer system.

Pittsburgh, 110 tons, De Paul University.

State of Michigan, 210 tons, State prison.

Peoria, Ill., 1100 tons, Hiram Walker Distillery.

Milwaukee, 300 tons, chemical and service buildings, municipal water purification plant; bids Aug. 26.

Los Angeles, 6575 tons, material for United States Engineers; bids closed Aug. 2.

San Francisco, 1700 tons, viaduct for San Francisco-Oakland Bay bridge; bids Aug. 18.

Los Angeles, 3300 tons, Palos Verdes feeder of Colorado River Aqueduct distribution system; bids by Metropolitan Water District, Sept. 1.

. . . . CHICAGO . . . .

. . . Ingot output unchanged at 85 per cent of district capacity.

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. . . Sales of leading producer are the best in four weeks.

o o o

. . . Bumper crops and high prices expected to usher in strong fall business.

CHICAGO, Aug. 3.—Ingot output this week is estimated at 85 per cent, unchanged from last week. The leading producer in this market reports the best week from the standpoint of sales and the second best specifications in the last four weekly periods. From other mills come reports of declining backlogs.

Agricultural machinery makers' demand is still the dominant factor in the district's business. A representative of one of the equipment companies stated that it would probably require two more years of near-capacity operations for the manufacturers of farm equipment to catch up with demand. Specifications for tonnages of shapes, bars, plates, wire, sheets and strip were placed last week by some of the implement and tractor companies. The unusual combination of large crops and high prices and the resultant great increase in farm income over recent years will further bolster buying of farm equipment.

Some small lots have been placed recently by automobile companies for new models, but buying in earnest for the new cars is not expected for several weeks. The low point in the model changeover period is expected to come within the next 10 days. Foundries that supply castings to the automotive trade are laying in supplies of iron, and some are already engaged on minor production schedules.

With weather conditions practically assuring the success of this year's bumper crops, railroads in the early fall are expected to face a car shortage, from which, steel men feel sure, will develop a secondary car buying program.

No. 1 steel scrap is quotable at $20 to $20.50, sales having been made at the higher figure.

Pig Iron

Shipments of pig iron and foundry coke are higher this week, an increase in the melt of the district hereby being indicated. Renewal of automobile production within the next two weeks will start iron flowing steadily once more to the foundries which make castings for that industry. Jobbing foundry activity is steady, as is production for machine tool builders. If the scrap market continues to rise, the high quotations may have an effect on the price of pig iron. Because of increased blast furnace activity here following the strikes, July pig iron production was considerably higher than that of June.

Plates

Backlogs generally are being reduced and the delivery situation is somewhat easier, although one mill is still not making a great deal of progress against its old orders. New freight car inquiries include 500 to 1000 box cars and 100 hopper cars for the Texas & Pacific. A car shortage has again been predicted for the fall, and steel salesmen are confidently expecting to see a renewal of large-scale car building. No benefits to steel mills from this movement, if it comes, are expected for three to four months. Heaviest current plate demand is for miscellaneous structural purposes. Inland Steel has reduced the price of floor plates 30c. per 100 lb.; effective at once for third and fourth quarter shipments the base price will be $3.55 per 100 lb. f.o.b. Chicago.

Structural Shapes

The end of the slump in structural activity is not yet in sight. Each week seems no better than the previous one. The Duffin Iron Co. last week was awarded the 1130 tons for the post office garage here. Bethlehem was awarded 716 tons for a hotel addition in Denver, and Worden-Allen will furnish 600 tons for a power house in Milwaukee. A Detroit housing project, involving 450 tons of shapes, went to Joseph T. Ryerson & Son, Inc. Among the inquiries is a bridge at Junction City, Kans., to require 820 tons, a coal tipple at Linton, Ind., to take about 600 tons, and the Kansas City court house, with 4000 tons, reported last week.

Bars

Bars are fairly active and deliveries are improving slightly. Best demand is from makers of agricultural machinery. Automobile purchasing is expected to pick up within a few weeks pending the changeover to 1938 models, specifications from that industry being few at present.

Sheets

There is no change in the sheet situation in this district. Deliveries are as bad as ever. There have been some reports, however, that one or two Eastern mills are invading this territory, promising deliveries of three and four weeks, which local mills find practically impossible to meet. If this is true, it reflects an easier sheet situation in the East as the freight absorption from there into this area would not attract busy mills. Specifications have been received in the past week from makers of steel tubes, farm machinery and many miscellaneous consumers.

Reinforcing Steel

The week has been quiet. It appears that little of major importance will develop for several weeks. Inland was awarded the 1900 tons of bars for the post office garage, as predicted last week, and Calumet Steel Co. was given 500 tons for a grain elevator in South Chicago and 200 tons for a building in Chicago. Prices are reported to be fairly firm.

Wire and Wire Products

Reports from outlying districts surrounding Chicago all indicate an unusually good fall, especially from the agricultural areas and makers of farm equipment. The large increase this year in farm income is expected to have a marked effect on sales to farmers, both directly in the way of fencing, etc., and indirectly through tractor and implement manufacturers, who are among the heaviest of the wire users. Stocks in the vicinity are reported to be broken, and jobber

demand will probably be good in the autumn. One seller received twice the number of strip orders this week as last week, and attributes the increase to automotive interest which will not really begin again in earnest for two to three weeks. Deliveries, except in strip, which calls for four to six weeks, are good.

. . . Dominion Steel to enter Ontario market with purchase of U. S. Steel properties.

TORONTO, Aug. 3.—Dominion Steel & Coal Corp. announces that a $2,000,000 deal has been completed for the purchase of four Ontario subsidiary plants of the United States Steel Corp. These are the Canadian Steel Corp. and Canadian Steel Lands, Ltd., Ojibway, Ont.; Canadian Bridge Co., Ltd., Walkerville, and Essex Terminal Railway Co., which covers the Walkerville-Windsor district in southern Ontario. These acquisitions will mark the entry of Dominion Steel into the Ontario markets and enable it to engage in the production of finished steel products. Until this time Dominion Steel's production has been at its Sydney, N. S., plant and smaller mills in that area restricted chiefly to primary products.

Officials of Dominion Steel and Coal Corp. are Arthur Cross, president; H. J. Kelley, first vice-president and general manager; W. M. McDonald, secretary-treasurer; C. B. Lang, vice-president in charge of sales; A. M. Irvine, vice-president in charge of coal sales.

While new business continues dull, sales in the past week showed some improvement. The betterment was due to the fact that several consumers were in the market to replenish stocks for current needs. Operations in the steel industry are at a high level, with indications pointing to a record year.

Merchant pig iron sales showed improvement for the week with total turnover of about 1200 tons. A number of melters had cleaned up stocks and were in the market for new supplies, while at the same time those covered by contract for this quarter are taking scheduled delivery. Curtailment in operations in the automotive industry is reflected in a slowing down of the melt in some plants, while others are maintaining high rates.

Trading in iron and steel scrap is fairly active. Steel mills are taking all the heavy melting steel offered and also are in the market for turnings. Foundries are showing interest in machinery cast and there is a pressing demand for supplies, but dealers experience difficulty in obtaining cast scrap to take care of all demands. Automobile scrap continues to pile up despite the increased shipments to the United States.

. . . Order books of mills filled to end of year.

LONDON, Aug. 3 (*By Cable*).—The Monday holiday was unobserved by most of the iron and steel plants as their order books are filled to the end of the year. There are numerous inquiries for 1938 delivery, but sellers are cautious.

British Iron and Steel Federation has negotiated for 100,000 tons of semi-finished steel on the Continent, shipment to be spread over several months.

Tin plate and sheet mills were closed this week for annual vacations.

Inquiries for steel are good, but makers are still hampered by inadequate supplies of raw material, chiefly sheet and tin plate bars.

Continental steel demand is fair, especially in organized markets. The usual autumn buying wave is expected to commence at any moment.

Continental export prices for pig iron have been reduced and are now £5 15s. for foundry iron and £5 12s. 6d. for basic iron, both sterling f.o.b. Antwerp.

Holland is to manufacture steel at Ymuiden.

Why Heat-Treated Wire Failed

FOR what the National Bureau of Standards terms "their painstaking investigation" in discovering the cause of failure of heat-treated bridge wire with the resulting great saving in money and possible saving in lives, W. H. Swanger and G. F. Wohlgemuth of the bureau, have been awarded the Charles Dudley Medal by the American Society for Testing Materials. This medal is awarded annually for the most valuable contribution to the science of testing materials.

Eight years ago the new Mount Hope Suspension Bridge was in process of construction to carry the main highway between Newport and Providence, R. I., over an arm of Narragansett Bay. A new type of heat-treated wire was used in the cables of the bridge which was supposed to possess advantages over the cold-drawn wire always used before in such cables, according to the Bureau of Standards.

When the bridge was nearly completed, but before it had been opened to traffic, it was found that many of these wires had broken at the anchorage shoes. The condition was found so serious that it was necessary to dismantle the entire bridge and to rebuild it, using the ordinary cold-drawn wire.

Then the National Bureau of Standards was asked to assist in determining the cause of failure of the heat-treated wire and many samples were obtained. A thorough investigation of the wire, including the conditions under which it was manufactured and stored and of the loads to which it was subjected on the bridge, was conducted by Swanger and Wohlgemuth under the direction of H. S. Rawdon, the chief of the bureau's Metallurgical Division.

It was soon found that the cause of failure was of a peculiar nature, because the wire did not show any obvious defects under the usual tests. Many different clues were followed up and finally a special testing machine was developed which subjected long specimens of the wire to conditions approaching as nearly as possible those which existed on the bridge.

The specimen of wire was looped over a support similar to the anchorage shoe and was subjected to a pulsating load duplicating that which occurred during the construction of the bridge. Such a load, it was known, would be caused by the swinging of the cables in the wind and by the movement of construction materials on to and off of the temporary floor system of the bridge.

On this machine, failures of the wire occurred exactly like those which developed in service. It was observed that the wire which was very stiff did not fit closely to the contour of the anchorage shoe. As the load came on and off the wire, it was bent back and forth at the shoe. Under such repeated bending this type of wire is weak and failure resulted under what would normally be a very moderate load.

. . PHILADELPHIA . .

. . . Operating rate down a point to 71 per cent.

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. . . Seasonal lull continues in most lines.

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. . . Scrap market holds its previous level.

PHILADELPHIA, Aug. 3.—District sales offices and eastern Pennsylvania mills have yet to see the expected upturn in business. Backlogs are being steadily reduced, particularly in plates, as evidenced by the noticeable shortening in delivery promises in recent weeks. Most mills can turn out plates within three or four weeks excepting the extremely wide sizes. On sheets, the delivery situation is not nearly so prompt, particularly on hot rolled grades, which run from 17 to 20 weeks for suppliers who are offering four to seven weeks on cold finished stock.

Structural activity and shipbuilding hold much promise in the near future. Automotive purchases for 1938 runs are just beginning to be reflected in this market, but will not assume their full importance much before the end of the month.

The delivery situation is still plaguing some pipe makers, who have lost business to competitors who were in a position to give better service. Dropping of one open hearth by Alan Wood Steel Co. has lowered the ingot production rate of the district to 71 per cent of capacity. In the absence of any new mill buying, scrap prices are unchanged, with No. 1 heavy melting steel quotable at $19.50 to $20.

Plates

Following the sizable purchase of plates by the Reading a few weeks ago, new railroad buying is low and no new developments are expected since two principal railroads are now practically committed for the year. Refinery buying is also low, although miscellaneous boiler and tank work is responsible for orders during the past week. In general, the seasonal lull continues, although it is less noticeable than in previous summers. Plate backlogs have been reduced to the point where delivery on new orders within three to four weeks is common, except on the widest plates. Most plate makers look to a quiet month. Labor difficulties at New York harbor shipyards are being felt in the absence of new orders, but local shipyards continue active on tankers. The readvertising of bids on the United States Lines vessel has excited some interest, but the revival of construction activity in the early fall is looked to as the largest single factor in the building up of mill backlogs.

Sheets

Sheet business remains low, but jobbers' sales of sheets have shown a slight pickup in recent weeks. Automotive buying has not materialized to any extent as yet, although the Budd company has made an initial commitment on frame stock for Chevrolet frames. Annual requirements approximate 75,000 tons. The Heintz Mfg. Co., automobile parts stamping plant, remains on strike. Radio plants continue active, and furnish an excellent outlet for strip, although some stamping work has been farmed out by RCA as a result of labor troubles last winter. Philco is expected to fabricate 2,000,000 sets this year.

Shapes and Bars

Awards for the week were up somewhat from the preceding one. Belmont Iron Works was awarded 320 tons of steel for the reconstruction of the B. & O. piers at Philadelphia; a local factory job involving 180 tons went to Lehigh Structural Steel Co.; a 170-ton grade elimination project went to Bethlehem Steel Co., while American Bridge was the successful bidder for Pennsylvania Railroad bridges at New Brunswick, N. J. Biggest project in the near future is the General Motors Trenton plant. Bids on the 4000 tons of structural are due at the Fisher Body works engineering department in Detroit on Aug. 10. Bids on the general contract are due Aug. 9. Activity is expected soon on the Pennsylvania State institutional program, involving an ultimate expenditure of $65,000,000. The first project to be started is the finance building at Harrisburg, involving 5000 tons. It is expected that bids will be opened shortly.

Pig Iron

New orders are largely for fill-in, although some tonnages are being placed for shipment in September. The foundry melt continues good, but stocks are ample and no consumers seem anxious to cover themselves against a possible $1 price rise the fourth quarter. Reaffirmation of finished steel prices has tended to discourage such a move, but the strong situation in scrap is a counterbalancing factor that pig iron sellers point to. Furnace stocks are low, and some blast furnaces are having difficulty in keeping up with delivery promises on certain grades.

Imports

The following iron and steel imports were received here during the week: 5353 tons of chrome ore from Cuba and 500 tons from Turkey; 1295 tons of pig iron from British India; 23 tons of tungsten ore from China; six tons of steel bars from Belgium; 13 tons of structural shapes from Belgium and 17 tons from France.

. . BIRMINGHAM . .

. . . Only mild recession in orders, none in operations.

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. . . Texas & Pacific inquiries for 600 to 1100 cars.

BIRMINGHAM, Aug. 3.—The Birmingham iron and steel industry is going through the summer in a most satisfactory manner. There has been little change in operations, which have been maintained steadily at high points, and there are still no indications of any recession and there will probably be none, as the fall markets will soon be opening. Roofing sheets and wire products have begun to show more life. Local producers are looking forward to an active fall market on account of the good crops in prospect. The crops are the finest in years, and there are indications that the farmers will

buy steel products liberally this fall.

There has been a drop in new tonnage during the past two months, as was to be expected after the heavy buying of the first six months. But even at that there has been a moderate flow of new business. The mills are now gradually cutting into their backlogs, but they are still pressed for deliveries and in some cases are still far behind.

The cotton tie season is now in full swing and there is a good movement in progress.

The Birmingham mills have now followed the action taken by other districts on prices for fourth quarter. Last week the Tennessee Coal, Iron & Railroad Co. announced new terms for galvanized roofing, siding and merchant flat sheets. No action on pig iron prices is likely before Sept. 1.

Pig iron shipments during the first part of July fell off slightly but improved toward the latter part, and total shipments for the month were about equal to those of June. There is a fair amount of current spot business from foundries that did not cover fully for the quarter.

Texas & Pacific Railroad has an inquiry out for 500 to 1000 box cars and 100 50-ton hopper cars. The order is expected to be placed the latter part of August. The Bessemer plant of the Pullman-Standard Car Mfg. Co. is now working on 500 cars for the Central of Georgia Railway. This order was placed in January, subject to approval by the Federal Court, and was reported at that time.

The Tennessee Coal, Iron & Railroad Co. announced last week plans for the construction of an office building and two smaller welfare buildings for the new tinplate mill. The new construction will cost about $300,000.

Nashville Bridge Co. has booked 175 tons of transmission towers from the T.V.A.

Open hearth and blast furnace operations are unchanged. Nineteen open hearths and all 18 blast furnaces were active last week and no change is planned for this week.

Another section of the Buffalo sewer job for which the L. A. Wells Construction Co., Cleveland, is low bidder, will require between 50 and 150 tons of reinforcing material, depending on what alternate plan is accepted.

Steel mill and blast furnace operation remains the same. Bethlehem's Lackawanna plant continues to operate 28 open hearths; Republic Steel Corp., seven, and Wickwire-Spencer Steel Co., two.

Pig iron business is quiet, with furnaces concentrating on replenishment of stocks.

..CAST IRON PIPE..

Grafton, W. Va., City Council, is seeking Federal funds to aid in financing a gravity water line for Tygart Dam to municipal water works. Project will require large tonnage of cast iron pipe and specials.

Charlotte, N. C., has let contract to Blythe Brothers Co., 422 South Brevard Street, for new raw water line and pumping station, comprising about 29,100 ft. of 24 and 30-in. J. B. Marshall is city manager.

Hollywood, Fla., plans pipe lines for extensions and replacements in water system. Fund of about $190,000 is proposed for this and other waterworks installation.

Port Arthur, Tex., plans pipe lines for extensions in water system, including main line from filtration plant; also new water tank and filtration equipment. Cost about $150,000. A bond issue in that sum is being arranged. M. D. Gates, Port Arthur, is engineer.

Seminole, Tex., plans pipe lines for water system; also new 50,000-gal. elevated steel tank and tower and motor-driven pumping machinery. A bond issue is being arranged. H. N. Roberts, 2415 Twentieth Street, Lubbock, Tex., is consulting engineer.

Board of Water Works Commissioners, East Jefferson Water Works District No. 1, Jefferson Highway and Arnoult Road, Jefferson Parish, La., asks bids until Aug. 10 for 1200 tons of 6 to 12-in. for extensions in water system; also for 50 tons of cast iron fittings, 170 6-in. cast iron gate valves and 170 cast iron gate boxes, and 50 two-way hydrants. Cost about $300,000, including administration building, meter shop and garage for which bids are being asked at same time. Scott & Brothers, Maritime Building, New Orleans, are engineers.

Mason City, Iowa, plans pipe lines for water system in North Polk Avenue, between Ninth and Twelfth Streets, and in North Massachusetts Avenue, from Fourth to Seventh Streets. C. H. Stevens is city engineer.

Eureka, Kan., plans about five miles of pipe for extensions in water system; also new wash water tank, pumping machinery, filter unit and other equipment. Fund of $91,000 is being arranged. Paulette & Wilson, National Reserve Building, Topeka, Kan., are consulting engineers.

Russell, Kan., plans pipe lines for main water supply from source on Smoky Hill River; also new pumping station and other waterworks installation. Bond issue of $127,000 has been authorized for work. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Portland, Ore., has awarded 400 tons of 6, 8 and 12-in. to United States Pipe & Foundry Co.

....PIPE LINES....

Duval Pipe Line Co., Corpus Christi, Tex., recently organized, plans welded steel pipe line from North and South Sweden oil fields, Duval County, Tex., to Corpus Christi, about 68 miles, for crude oil transmission to bulk terminal of Republic Oil Co., at last noted place. Booster pumping stations will be installed along route, with main pumping plant in oil field mentioned to handle output of a number of producers. Benedum-Trees Oil Co., Benedum-Trees Building, Pittsburgh, is interested in new company, which will establish executive offices in Pittsburgh.

Gulf Oil Corp., Gulf Building, Houston, Tex., plans new welded steel pipe line from recently opened Lodi oil field district, Marion County, Tex., to connection with main pipe line in Rodessa, La., area about nine mines for crude oil transmission. Pipe-line-gathering system will be installed in Lodi field.

Laughner Oil & Gas Co., Inc., South Heights (Beaver County), Pa., plans extensions in welded steel pipe lines in parts of Sewickley, Marshall and Franklin Townships, Allegheny County, and Economy and Harmony Townships, Beaver County, for natural gas transmission. Cost close to $100,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 13 for 2920 ft. of welded steel pipe, and 5000 ft. of galvanized welded steel pipe (Schedule 3276).

Metropolitan Water District, 306 West Third Street, Los Angeles, asks bids until Sept. 1 for welded steel pipe for Palos Verdes feeder of Colorado River Aqueduct in South Pasadena, Vernon, Los Angeles and part of Los Angeles County, totaling 17.4 miles, in all, as follows: 5.5 miles of 55-in., and 11.9 miles of 51-in. welded steel pipe, with Gunite exterior coating and without lining; alternate bids for same diameter pipe and same lengths, with Gunite exterior coating and centrifugally applied (spun) mortar lining; alternate bids for 5.5 miles of 57-in., and 11.9 miles of 53-in. welded steel pipe with Gunite exterior coating and coal-tar enamel lining; and alternate bids for 5.5 miles of 54-in., and 11.9 miles of 50-in. lock-joint steel cylinder reinforced precast concrete pipe (Specifications 225). F. E. Weymouth is general manager and chief engineer.

Cities Service Pipe Line Co., Tulsa, Okla., plans about five miles of 16 and 18-in. welded steel pipe in connection with reconditioning present welded steel pipe lines for natural gas transmission from Tallant to Cotton Valley, Okla., and in vicinity of Commerce, Ottawa County, Okla.

Construction Quartermaster, Sacramento Air Depot, Sacramento, Cal., asks bids until Aug. 9 for pipe for gas distribution (Proposal 6870-1).

St. Maries, Idaho, City Council, is asking bids on 1700 ft. of 12-in. steel pipe.

....BUFFALO....

... *Lull in building jobs; pig iron business quiet.*

BUFFALO, Aug. 3.—A lull in building operations has cut down the volume of fabricated structural and reinforcing bar jobs, with little sizable prospective business.

A Pennsylvania Railroad grade crossing at Montour Falls will require 500 tons of structural. Bids will be taken Aug. 11.

. . . CLEVELAND . . .

. . . Operations higher with sharp advance in Youngstown district.

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. . . Incoming business is better, although backlogs continue to drop.

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. . . Pig iron sellers still uncertain about fourth quarter prices.

CLEVELAND, Aug. 3.—Producers here are now viewing the future with increasing confidence. Orders received during the week were perceptibly greater in volume than those entered the previous week, and, though backlogs still are easing off slightly, there is every indication that the next two weeks will witness either a balance between shipments and orders or even a slight lift in backlogs as a forerunner of the heavy fall demand expected in all quarters.

The delivery situation here is still quite ragged and has, if anything, even been made easier by the return of struck mills to capacity production. In numerous instances many products can be obtained in what is considered a normal interval, whereas unusual sizes or gages are still difficult to obtain in less than two months or more.

All of the struck plants in the Cleveland-Lorain and in the Valley area are working at close to theoretical capacity. A small CIO group in Cleveland is still causing Republic a little concern and there continues to be a nucleus of malcontents which may be the source of future trouble in the Warren and Canton districts. In all cases, however, these groups are daily becoming more impotent. Finishing departments are converting all the steel available to catch up on delayed orders, and open-hearth activity in the Cleveland-Lorain area has advanced one point to 83 per cent of capacity. For the Youngstown district the return to normalcy is more pronounced, the current week registering a seven-point advance to 85 per cent of theoretical capacity.

Pig Iron

Some miscellaneous contracting is being done, but the majority of melters are amply protected for third quarter requirements and see no incentive to take on additional commitments until fourth quarter positions are available. Consumers show no concern about a possible price advance, being of the opinion that prices will be reaffirmed unless the recent bullish flurry in scrap is either maintained or accentuated over the next month. Foundry melt is currently passing through a seasonal recession, what with mass vacations and a temporary cessation in automobile demand. However, orders on books and in prospect are indicative of an active fall period. Export orders here are being liquidated rapidly, and there is little new firm foreign inquiry up for consideration.

Sheets and Strip

Specifications from the general trade are picking up a little, but deliveries continue to outrun the total volume of new business. For this reason, promises on sheets show a slight improvement, although nothing better than three to five weeks is possible in cold rolled grades with hot rolled material running up to 12 weeks or more in some instances. Several factors in the automotive trade have made good purchases, but demands for this material will not be urgent until 1938 models go into full production; thus pressure from this quarter is not expected for at least a month. Following the lead of a Southern producer, at least one seller here has revised its set-up in galvanized sheets and formed roofing. All jobbers' discounts on flat galvanized sheets and 25 gage and heavier roofing have been discarded. On 26, 28 and 29 gages, jobbers and dealers are permitted a functional allowance of 10c. per 100 lb. and an additional allowance of 15c. per 100 lb. for quantities of 80,000 lb. and over when purchased at one time for delivery at one destination. On galvanized sheets the less-than-carload mill price has been increased, which action will tend to throw more of this type of business to jobbers and dealers.

Wire Products

A slight improvement in miscellaneous demand has been noticeable during the week, although merchant wire products and manufacturing wire are still in a seasonal slump. Mills are taking advantage of their opportunity to build up stocks, which in turn will smooth out operations when peak demands come into the market during September and October.

Bars, Plates and Shapes

Shape tonnage in the aggregate now being figured by estimators is better than for any similar period since May. Most of the jobs are small in size, however, although several attractive projects are receiving considerable attention, as for instance a 600-ton Cuyahoga County bridge, a 300-ton North Canton building for the Hoover Co. and 300 tons for a Fisher Body Corp. crane runway. Bids on the 300-ton Gulf Refining Co. hangar have been discarded, and the job is being redesigned for readvertising in the near future. Plate projects are spotty and in small volume, the only noteworthy inquiry being for 600 tons of 48-in. pipe for Industrial Rayon Corp. at Painesville, Ohio. New plate inquiry of attractive size can now bring an eight-week delivery, but usual promises are still in the neighborhood of 10 weeks. Reinforcing bars continue to move very slowly. Mills have built up normal stocks and quick delivery is now the rule. Secondary sellers, in their desire for turnover, have recently been prone to shade quotations.

Warehouse Business

Prices are unaltered. July business, in the final reckoning, was considerably better than had been expected, being only about 10 per cent under the June total. Sheet demand has fallen off, bars and small shapes continue in good demand and most sellers are experiencing a buying flurry in plates.

Iron Ore

Ore movement from upper Lake ports for July, totaling 10,704,457 tons, was the third largest on record and the highest July movement

since 1929, at which time 10,670,882 tons were delivered. The total amount of ore moved this year up to Aug. 1 was 34,626,751 tons, compared with 18,837,073 tons for the equivalent period in 1936, or an increase of 83.82 per cent.

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. . . New projects lower at 11,200 tons compared with 17,800 tons a week ago.

o o o

. . . Plate awards total 1820 tons.

NORTH ATLANTIC STATES

Leominster, Mass., 250 tons, Cluett, Peabody & Co. plant, to Bethlehem Steel Co.

Brattleboro, Vt., 100 tons, theater, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

Mechanic Falls-Minot, Me., 100 tons, State bridge, to Bethlehem Steel Co.

Shelton, Conn., 170 tons, Blumenthal dye house, to Berlin Construction Co., Berlin, Conn.

New York, 420 tons, curbs and roof supports, New York-Queens East River tunnel, to Commercial Shearing & Stamping Co., Youngstown, Ohio.

New York, 883 tons, Westchester Avenue bridge in Bronx, to American Bridge Co.

New York, 230 tons, Dollar Savings Bank building in Bronx, to Bethlehem Steel Co.

Queens, N. Y., 900 tons, shield for New York-Queens East River tunnel, contract No. 4, to Alco Products, Inc., Dunkirk, N. Y.

Attica, N. Y., 125 tons, cell building, State prison, to F. L. Heughes & Co., Rochester, N. Y.

Broome County, N. Y., 105 tons, State bridge, to Utica Steam Engine & Boiler Works, Utica, N. Y.

Erie County, N. Y., 135 tons, bridge, to Lackawanna Steel Construction Corp., Buffalo.

New Brunswick, N. J., 1145 tons, five bridges, Pennsylvania Railroad, to American Bridge Co.

Annandale, N. J., 170 tons, State highway grade elimination over Central Railroad of New Jersey tracks, to Bethlehem Steel Co.

Greenville, Pa., 260 tons, extension to structural shop, Chicago Bridge & Iron Works, to Bethlehem Steel Co.

Wilkes-Barre, Pa., 105 tons, theater, to Weatherly Steel Co., Weatherly, Pa.

Philadelphia, 180 tons, factory building, 17th and Wood Streets, to Lehigh Structural Steel Co., Allentown, Pa.

Philadelphia, 325 tons, Baltimore & Ohio pier reconstruction, to Belmont Iron Works, Philadelphia.

Pittsburgh, 500 tons, repairs to Glenwood bridge, to Pittsburgh Bridge & Iron Works, Rochester, Pa.

Johnstown, Pa., 275 tons, Pennsylvania telephone building, to Griffith-Custer Steel Co., Johnstown.

Washington, 125 tons, Lafayette school, to Fort Pitt Bridge Works Co., Pittsburgh.

THE SOUTH

Bellwood, Va., 265 tons, buildings, to Virginia Bridge Co., Roanoke, Va.

Hawkins-Sullivan Counties, Tenn., 140 tons, bridge, to Nashville Bridge Co., Nashville, Tenn.

Kingfisher County, Okla., 190 tons, bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

CENTRAL STATES

Saginaw, Mich., 225 tons, addition to finishing department, Saginaw Malleable Iron Division, General Motors Corp., to Austin Co., Cleveland.

Detroit, 160 tons, power house addition, Briggs Mfg. Co., to Whitehead & Kales Co., Detroit.

Detroit, 450 tons, Parkside housing project, to Joseph T. Ryerson & Son, Inc.

Cleveland, 103 tons, train shed, Fisher Body Co., to R. C. Mahon Co., Detroit.

Zanesville, Ohio, 350 tons, mill building, American Rolling Mill Co., to Joseph T. Ryerson & Son, Inc.

Toledo, Ohio, 135 tons, warehouse for Fort Pitt Steel Co., to Levinson Steel Co., Pittsburgh.

Toledo, 100 tons, addition to Electro Auto-Lite plant, to Ohio Structural Steel Co., Newton Falls, Ohio.

Chicago, 275 tons, repairs to 18th Street bridge, to Fort Pitt Bridge Works Co.

Chicago, 1130 tons, post office garage, to Duffin Iron Works, Chicago.

Milwaukee, 600 tons, power house, to Worden-Allen Co., Milwaukee.

Geary, Kan., 875 tons, bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

WESTERN STATES

Denver, 716 tons, hotel addition, to Bethlehem Steel Co.

Santa Monica, Cal., 760 tons, addition to assembly building, Douglas Aircraft Co., to Western Pipe & Steel Co., San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Willimantic, Conn., 407 tons, grade crossing.

Newington, Conn., 174 tons, grade crossing.

Windham, Conn., 450 tons, State highway bridge.

New York, 1300 tons, superstructure, Flushing River bridge, Department Plants & Structures; bids close Aug. 10.

New York, 200 tons, building for St. Andrew's Church.

Montour Falls, N. Y., 500 tons, grade crossing elimination over Pennsylvania Railroad; bids Aug. 11.

Smiths Basin, N. Y., 330 tons, bridge, State Department of Public Works.

Cranford, N. J., 560 tons, manufacturing building, Inland Mfg. Division, General Motors Corp.

CENTRAL STATES

Detroit, 100 tons, Lincoln Motor Co., conveyer bridge and two substations.

Pontiac, Mich., 250 tons, Pontiac Motor Car Division, General Motors Corp., administration building and foundry addition.

Toledo, Ohio, 200 tons, addition, Auto City Stamping Co.; Albert Kahn, Detroit, architect.

Evansville, Ind., 260 tons, office building addition for Sunbeam Electric Mfg. Co.

Linton, Ind., 500 tons, coal tipple.

Streator, Ill., 650 tons, warehouse, Owens-Illinois Glass Co.

Rockford, Ill., 240 tons, store building, S. H. Kress & Co.

Milwaukee, 500 tons, chemical and service building, municipal water purification plant; bids Aug. 26.

St. Louis, 3000 tons, Marine Hospital.

Junction City, Kan., 820 tons, bridge.

Chaffee and Kiowa Counties, Colo., 400 tons, two State bridges; bids Aug. 10.

Bonneville, Ore., 300 tons, trash racks for Bonneville dam, bids Aug. 6; 100 tons for same project, bids Aug. 13.

FABRICATED PLATES

AWARDS

Queens, N. Y., 1250 tons, 46-in. and 36-in. water mains, to Alco Products Co., Dunkirk, N. Y.

Ithaca, N. Y., 110 tons, standpipe, to Chicago Bridge & Iron Works, Chicago.

Cleveland, 125 tons, gas holder, to Chicago Bridge & Iron Works.

Oberlin, Ohio, 135 tons, elevated water tank, to Pittsburgh-Des Moines Steel Co.

Dallas, Tex., 200 tons, tank for Phoenix Engineering Corp., to Wyatt Metal & Boiler Co., Dallas.

NEW PROJECTS

New Orleans, 200 tons, two 100-ton derrick barges, United States Engineer's office; bids taken Aug. 3.

Iberia, La., 500 tons, tanks.

Los Angeles, 100 tons, welded steel tanks for Colorado River Aqueduct pumping plants; bids Aug. 10.

Los Angeles, 4700 tons, Palos Verdes feeder of Colorado River Aqueduct distribution system; bids by Metropolitan Water District Sept. 1.

SHEET PILING

NEW PROJECTS

Willimantic, Conn., 555 tons, grade crossing.

Newington, Conn., 390 tons, grade crossing.

Knoxville, Tenn., 416 tons, requisition 107706, Tennessee Valley Authority.

Chicago, 808 tons, dock wall, Lake Calumet Harbor; project requires 189 tons of standard piling and 619 tons of Z piling; bids taken Aug. 2.

. . .NON-FERROUS. . .

. . . *Copper very active; London prices continue to rise.*

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. . . *Zinc sellers accepting only routine business.*

o o o

. . . *Tin stocks increased 2598 tons.*

NEW YORK, Aug. 3.—Strong consumer interest continues to evidence itself in the copper market, with exceptionally heavy buying over the week end driving total sales for the month up to 62,298 tons, the largest tonnage since February. The heavy current buying reflects the entrance of independent consumers into a market that heretofore had depended upon company-affiliated fabricators for support. Quotations continue firm and unchanged at 14c. per lb., Connecticut Valley, for electrolytic copper. London buying interest is moderately active, and prices advanced today to 14.625c. per lb., c.i.f., usual Continental base ports.

Zinc

The scarcity of prompt metal is causing many sellers to limit their sales to well established customers only. Considerable metal is being imported in an effort to alleviate the chronic shortage of supplies, but a not too-plentiful supply abroad is holding imports below the amount that could readily be absorbed by this country. Sales of all grades for the week were 6200 tons. Shipments totaled 6567 tons, leaving undelivered metal at 81,750 tons. Prices remain steady and unaltered at 7.35c. per lb., New York. Spelter is quoted in London today at 5.11c. per lb., as compared with 4.98c. last week, in an active market.

Lead

Although books were officially opened for September business on Monday, little buying was done as most consumers are centering their buying on August positions. Demand continues in excellent form with all types of users represented in the market, buying at a very firm price level of 6c. per lb., New York. The heavy demand sustained throughout July will undoubtedly give that month a total sales figure substantially in excess of June's.

Tin

New bookings continue light and the market is basically unchanged from last week. Statistics for July show deliveries of 4980 tons, 1665 tons under the June figure, and the lowest total since November, 1935. Stocks increased 2598 tons to 20,754 tons. Actually these figures do not represent the true market situation for July, due to the arrival of boats near the end of the month, too late to unload in time to be included in July data. Hence, this tin, entering August's figures, will expand that month's total abnormally. However, the average for the two months will probably reflect normal conditions. Straits tin is quoted today at 58.875c. per lb., New York. Spot metal was priced at £262 10s, and three months at £260 5s, on first call in London this morning.

July Averages

The average prices of the major non-ferrous metals in July, based on the daily quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, Conn. Valley	14.00c.
Lake copper, Eastern delivery	14.125c.
Straits tin, spot, New York	59.344c.
Zinc, East St. Louis	6.92c.
Zinc, New York	7.27c.
Lead, St. Louis	5.85c.
Lead, New York	6.00c.

The Week's Prices. Cents Per Pound for Early Delivery

	July 28	July 29	July 30	July 31	Aug. 2	Aug. 3
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.125	14.125	14.125	14.125	14.125	14.125
Straits tin, spot, New York	59.125	59.00	58.50	....	58.75	58.875
Zinc, East St. Louis	7.00	7.00	7.00	7.00	7.00	7.00
Zinc, New York	7.35	7.35	7.35	7.35	7.35	7.35
Lead, St. Louis	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 15.375c. a lb., prompt, f.o.b., New York.
Quicksilver, $94.00 to $96.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 14.00c. a lb., less carload, delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	60.25c. to 61.25c.
Tin, bar	63.50c. to 64.50c.
Copper, Lake	15.00c. to 16.00c.
Copper, electrolytic	15.00c. to 16.00c.
Copper, castings	14.75c. to 15.75c.
*Copper sheets, hot-rolled	21.78c.
*High brass sheets.	19.75c.
*Seamless brass tubes	22.50c.
*Seamless copper tubes	22.625c.
*Brass rods	16.25c.
Zinc, slabs	8.25c. to 9.25c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.75c.
Lead, American pig.	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut	10.50c.
Antimony, Asiatic	16.25c. to 16.75c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	35.00c. to 36.00c.
Babbitt metal, commercial grade	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	62.75c.
Tin, bar	64.75c.
Copper, Lake	15.00c. to 15.25c.
Copper, electrolytic	15.00c. to 15.25c.
Copper, castings	14.75c. to 15.00c.
Zinc, slabs	8.25c. to 8.50c.
Lead, American pig.	6.50c. to 6.75c.
Lead, bar	10.00c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	25.25c.
Babbitt metal, high grade	66.75c.
Solder, ½ and ½	39.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	10.75c.	11.50c.
Copper, hvy. and wire	10.125c.	10.625c.
Copper, light and bottoms	9.125c.	9.375c.
Brass, heavy	6.125c.	6.75c.
Brass, light	5.00c.	5.75c.
Hvy. machine composition	9.00c.	9.50c.
No. 1 yel. brass turnings	7.375c.	7.875c.
No. 1 red brass or compos. turnings	8.75c.	9.25c.
Lead, heavy	4.625c.	5.00c.
Cast aluminum	12.125c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.50c.	3.875c.

IRON AND STEEL SCRAP

. . . No. 1 steel rises 50c. at Pittsburgh and Chicago.

o o o

. . . Composite figure now at $20.42.

AUG. 3.—Iron and steel scrap continues to exhibit strength in most districts. On the strength of consumer sales at Chicago and Pittsburgh, the price of No. 1 heavy melting steel has been advanced 50c. at both points, bringing the Pittsburgh average figure to $21.25. At Philadelphia, in the absence of any new buying by consumers, the previous price level is maintained, bringing THE IRON AGE composite figure for the three districts to $20.42, up 33c. from the preceding week. The average for July was $18.79, as compared with $17.28 for June, the lowest month of the year.

At Detroit, bidding on automotive lists was rather wild, variations in offerings being as much as $2.50 a ton as brokers vied with one another for the material. In other districts, competitive bidding for limited yard supplies is influencing a rise in buying prices. Railroad material is very strong.

Pittsburgh

At least three sales of No. 1 steel into consumption at $21.50 have been made in the past week, a moderate sized tonnage having been purchased within the last few days. No. 1 steel is quotable at $21 to $21.50 a ton. While some dealers are able to cover at $21 a ton, $21.25 has been paid and there are indications that consumers may pay higher than present levels on the next substantial sale. The market continues exceptionally strong, but activities are being held up pending the outcome on several railroad lists this week. Railroad heavy melting has been sold in this district at $22 and $22.50 a ton, but tonnages involved have not been large.

Chicago

Last week's sharply increased prices on the basis of brokers' bids were fully justified late last week when tonnages were purchased by two local mills at $20 and $20.50. Now brokers state that $21.50 has been unsuccessfully bid. But there appears to be no strong effort to obtain material at that price. Scrap is moving freely at the moment and mill shipments are so heavy that one, at least, has asked brokers to decrease the rate slightly. A large tonnage of scrap of various grades will be disposed of here this coming week as lists of several railroads, including the Baltimore & Ohio, Chicago & North Western, New York Central, Wabash, Nickel Plate and Chicago surface lines, are submitted for bids.

Philadelphia

In the absence of any new mill buying, prices remain unchanged, with No. 1 steel still quotable at $19.50 to $20, delivered to consumer. The market tone is strong, but a further rise will be predicated upon a wider spread in the differential between Philadelphia and Pittsburgh markets, according to some brokers. The present near parity precludes any movement of scrap west of Harrisburg. Similarly, the local area is temporarily out of the export market, what with present barge prices at New York, Boston and Southern ports.

Cleveland

Mills here are well supplied with scrap and consequently are exhibiting little or no interest in the current market. None the less, the price undertone is growing stronger, mostly in sympathy with advances in nearby districts, and partly as a reflection of the brokers' belief that users will shortly come into the market for additional commitments. Brokers here are paying up to $19.50 for No. 1 steel, and machine shop turnings have recently been moved in Youngstown and Cleveland at $15.50 and $13.50 respectively.

Buffalo

The market is strong, with a few sales being made. No. 1 heavy melting steel at outlying points has brought as high as $21 in a lot of about 1000 tons. The largest consuming interest has raised its offering price to $19.50 for No. 1 and $17.50 for No. 2 steel. No sales are reported at these figures. Another mill has held up shipments for a 10-day period, after having restricted them for some time. The reason given is that unloading facilities are being taxed by heavy Lake shipments. No. 1 machinery cast and No. 1 cupola cast is in demand with sales of cupola noted at $18 and sales of No. 1 machinery at $19.

Boston

Prices on scrap for domestic delivery have moved into higher ground, those on No. 1 heavy melting steel being nearly $1 a ton above a week ago. The export market averages 50c. a ton higher. Shipments of steel turnings, blast furnace material, bundled skeleton, breakable cast and shafting to Pennsylvania points the past week were slightly larger than for the previous week. The movement of Nos. 1 and 2 steel is confined almost exclusively to export contracts. Exports, however, have slowed up somewhat, largely because Japan has held up orders. The bulk of shipments are to England and Italy.

Cincinnati

Dealer activity is strong as the trade seeks advantageous position in the face of a rising market. Mill buying is more active, although heavy tonnages are still exceptional. The supply of steel grades is restricted and dealers bid avidly for available material. Increased bids affected the whole list the past week, but lighter material merely followed the heavier grades.

St. Louis

Although railroad lists of scrap iron for sale are light, dealers' offerings and shipments are increasing, serving to check the rising tendency of prices. There was no change this week. Dealers do not look for any new buying by the steel mills for the next 60 days.

New York

The market continues strong, with brokers having difficulty in attracting material in any quantity at any price. Although the asking price for No. 1 steel is nominally $16, the quoted range of $16 to $16.50 more nearly represents the true picture. Hot weather is having its slowing up effect upon yard activity, and this factor together with a bullish attitude on the part of dealers is going to bring higher prices for whatever material is moved. Domestic sales into consumption were reported during the week, some made to mills in the Pittsburgh district. New export orders are absent, and none looked for immediately.

Detroit

Sellers found wide variations in the bids they received during the last week on the series of relatively heavy automotive lists they had offered. In some cases dealers' offers showed variations as great as $2.50 a ton. As each succeeding list was closed dealers increased their offered prices, exhibiting extreme bullishness apparently as the result of moderate buying by the mills, both local and outside Detroit. Lists offered in the last week were in general indefinite as to quantity, indicating that scrap production will fall off sometime during August as the rest of the automotive plants close down. Strongest trends of the last week were exhibited by borings and turnings, which now have gone up about $3.50 in a month.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$21.00 to $21.50
Railroad hvy. mltng.	22.00 to 22.50
No. 2 hvy. mltng. steel	18.50 to 19.00
No. 2 RR. wrought	21.00 to 21.50
Scrap rails	22.50 to 23.00
Rails 3 ft. and under	25.50 to 26.00
Comp. sheet steel	21.00 to 21.50
Hand bundled sheets	19.00 to 19.50
Hvy. steel axle turn.	19.00 to 19.50
Machine shop turn.	15.00 to 15.50
Short shov. turn.	15.00 to 15.50
Mixed bor. & turn.	15.00 to 15.50
Cast iron borings	15.00 to 15.50
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast	16.50 to 17.00
No. 1 cupola cast	20.00 to 20.50
RR. knuckles & cplrs.	25.50 to 26.00
Rail coil & leaf springs	25.50 to 26.00
Rolled steel wheels	25.50 to 26.00
Low phos. billet crops	26.00 to 26.50
Low phos. sh. bar	25.00 to 25.50
Low phos. punchings	23.50 to 24.00
Low phos. plate, hvy.	24.50 to 25.00
Low phos. plate clips	22.50 to 23.00
Steel car axles	25.00 to 25.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	18.00 to 18.50
Comp. sheet steel	18.50 to 19.00
Light bund. stampings	14.00 to 14.50
Drop forge flashings	17.50 to 18.00
Machine shop turn.	13.00 to 13.50
Short shov. turn.	13.00 to 13.50
No. 1 busheling	18.00 to 18.50
Steel axle turnings	15.00 to 15.50
Low phos. billet and bloom crops	25.50 to 26.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	13.50 to 14.00
No. 2 busheling	13.50 to 14.00
No. 1 cast	19.00 to 19.50
Railroad grate bars	11.50 to 12.00
Stove plate	11.00 to 11.50
Rails under 3 ft.	24.00 to 24.50
Rails for rollings	21.00 to 21.50
Railroad malleable	22.00 to 22.50
Cast iron carwheels	.... 21.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	17.00 to 17.50
Hydraulic bund., new	18.00 to 18.50
Hydraulic bund., old	15.00 to 15.50
Steel rails for rolling	21.00 to 21.50
Cast iron carwheels	19.50 to 20.00
Hvy. breakable cast	19.00 to 19.50
No. 1 cast	20.50 to 21.00
Stove plate (steel wks.)	15.50 to 16.00
Railroad malleable	19.50 to 20.00
Machine shop turn.	13.50 to 14.00
No. 1 blast furnace	13.00 to 13.50
Cast borings	13.00 to 13.50
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	24.00 to 24.50
Couplers & knuckles	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	25.50 to 26.00
Shafting	24.00 to 24.50
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)	14.50 to 15.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$20.00 to $20.50
Auto. hvy. mltng. steel, alloy free	18.00 to 18.50
No. 2 auto. steel	16.00 to 16.50
Shoveling steel	19.50 to 20.00
Hydraul. comp. sheets	19.00 to 19.50
Drop forge flashings	16.00 to 16.50
No. 1 busheling	18.50 to 19.00
Rolled carwheels	22.50 to 23.00
Railroad tires, cut	22.50 to 23.00
Railroad leaf springs	22.00 to 22.50
Steel coup. & knuckles	21.50 to 22.00
Axle turnings	18.00 to 18.50
Coil springs	24.00 to 24.50
Axle turn. (elec.)	19.00 to 19.50
Low phos. punchings	22.00 to 22.50
Low phos. plates, 12 in. and under	22.00 to 22.50
Cast iron borings	12.00 to 12.50
Short shov. turnings	12.50 to 13.00
Machine shop turn.	10.50 to 11.00
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft.	22.00 to 22.50
Steel rails under 2 ft.	22.50 to 23.00
Angle bars, steel	22.00 to 22.50
Cast iron carwheels	19.50 to 20.00
Railroad malleable	21.50 to 22.00
Agric. malleable	17.50 to 18.00

	Per Net Ton
Iron car axles	$26.00 to $26.50
Steel car axles	23.50 to 24.00
No. 1 RR. wrought	17.25 to 17.75
No. 2 RR. wrought	17.25 to 17.75
No. 2 busheling, old	9.50 to 10.00
Locomotive tires	19.00 to 19.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast	16.50 to 17.00
Clean auto. cast	15.50 to 16.00
No. 1 railroad cast	15.50 to 16.00
No. 1 agric. cast	14.00 to 14.50
Stove plate	12.00 to 12.50
Grate bars	13.50 to 14.00
Brake shoes	13.00 to 13.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	17.50 to 18.00
Scrap rails	20.50 to 21.00
New hvy. b'ndled sheet	17.50 to 18.00
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	17.50 to 18.00
No. 1 busheling	17.50 to 18.00
Hvy. axle turnings	14.00 to 14.50
Machine shop turn.	12.50 to 13.00
Knuckles & Couplers	22.00 to 23.00
Coil & leaf springs	22.00 to 23.00
Rolled steel wheels	22.00 to 23.00
Low phos. billet crops	22.00 to 23.00
Shov. turnings	14.00 to 14.50
Mixed bor. & turn.	13.00 to 13.50
Cast iron borings	13.00 to 13.50
Steel car axles	21.00 to 22.00
No. 1 machinery cast	18.50 to 19.00
No. 1 cupola cast	17.50 to 18.00
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	23.00 to 24.00
Cast iron carwheels	18.00 to 18.50
Railroad malleable	20.00 to 20.50
Chemical borings	13.50 to 14.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$16.00 to $16.50
Scrap steel rails	.... 17.00
Short shov. turnings	9.00 to 10.00
Stove plate	.... 10.00
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought	13.00 to 15.00
Rails for rolling	13.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. metal	$17.00 to $17.50
No. 1 hvy. melting	16.50 to 17.00
No. 2 hvy. melting	14.75 to 15.25
No. 1 locomotive tires	18.50 to 19.00
Misc. stand.-sec. rails	17.50 to 18.00
Railroad springs	21.00 to 21.50
Bundled sheets	10.00 to 10.50
No. 2 RR. wrought	16.50 to 17.00
No. 1 busheling	12.00 to 12.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	19.00 to 19.50
Machine shop turn.	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Steel car axles	21.50 to 22.00
Iron car axles	22.50 to 23.00
No. 1 RR. wrought	14.00 to 14.50
Steel rails under 3 ft.	19.00 to 19.50
Steel angle bars	19.00 to 19.50
Cast iron carwheels	17.50 to 18.50
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	18.50 to 19.00
No. 1 railroad cast	14.00 to 14.50
Stove plate	11.50 to 12.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel	14.50 to 15.00
Scrap rails for mltng.	19.50 to 20.00
Loose sheet clippings	13.00 to 13.50
Hydrau. b'ndled sheets	16.00 to 16.50
Cast iron borings	10.50 to 11.00
Machine shop turn.	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
No. 2 busheling	8.00 to 8.50
Rails for rolling	21.50 to 22.00
No. 1 locomotive tires	18.50 to 19.00
Short rails	22.50 to 23.00
Cast iron carwheels	16.50 to 17.00
No. 1 machinery cast	15.50 to 16.00
No. 1 railroad cast	15.50 to 16.00
Burnt cast	11.00 to 11.50
Stove plate	11.00 to 11.50
Agricult. malleable	17.50 to 18.00
Railroad malleable	19.00 to 19.50
Mixed hvy. cast	13.50 to 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$16.50 to $17.00
No. 2 hvy. mltng. steel	15.50 to 16.00
Borings and turnings	13.00 to 13.50
Long turnings	12.25 to 12.75
Short shov. turnings	13.50 to 14.00
No. 1 machinery cast	16.00 to 16.50
Automotive cast.	16.75 to 17.25
Hydraul. comp. sheets	18.50 to 19.00
Stove plate	10.50 to 11.00
New factory bushel	16.50 to 17.00
Old No. 2 busheling	11.25 to 11.75
No. 2 busheling (black fender stock)	13.25 to 13.75
Sheet clippings	13.00 to 13.50
Flashings	15.75 to 16.25
Low phos. plate scrap	18.00 to 18.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $20.50
Hydraulic bundles	19.50 to 20.00
Machine shop turn.	15.00 to 15.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel	14.50 to 15.00
Hvy. breakable cast	15.50 to 16.00
No. 1 machinery cast	15.50 to 16.00
No. 2 cast	14.50 to 15.00
Stove plate	11.50 to 12.00
Steel car axles	25.00 to 26.00
Shafting	19.50 to 20.00
No. 1 RR. wrought	17.50 to 18.00
No. 1 wrought long	16.50 to 17.00
Spec. iron & steel pipe	13.00 to 13.50
Rails for rolling	19.00 to 19.50
Clean steel turnings	9.50 to 10.00
Cast borings	9.00 to 9.50
No. 1 blast furnace	9.00 to 9.50
Cast borings (chem.)	12.50 to 13.00
Unprepar. yard scrap	9.50 to 10.00
Per gross ton, delivered local foundries:	
No. 1 machn. cast	$17.00 to $17.50
No. 1 hvy. cast cupola	14.50 to 15.00
No. 2 cast	14.00 to 14.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$14.80 to $15.30
Scrap rails	15.05 to 15.55
No. 2 steel	13.80 to 14.30
Breakable cast	14.75 to 15.00
Machine shop turn.	9.25 to 9.75
Mixed bor. & turn	9.25 to 9.75
Bund. skeleton long	12.25 to 12.75
Shafting	18.75 to 19.00
Cast bor. chemical	9.00 to 10.00
Per gross ton delivered consumers' yards:	
Textile cast	$17.00 to $18.00
No. 1 machine cast	.... 18.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton

	Toronto	Montreal
No. 1 hvy. mltng. stl.	$12.50	$12.00
No. 2 hvy. mltng. stl.	11.50	11.00
Mixed dealers steel	11.00	10.50
Scrap pipe	10.00	9.75
Steel turnings	8.00	8.00
Cast borings	9.25	9.00
Machinery cast	16.00	15.50
Dealers cast	14.00	14.00
Stove plate	12.00	11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel	.... $16.50
No. 2 hvy. mltng. steel	.... 15.00
No. 2 cast	.... 14.00
Stove plate	.... 11.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Rails (scrap)	17.00 to 17.50
Philadelphia, delivered alongside boats, Port Richmond	
No market at present.	
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mltng. steel	.... $17.50
No. 2 hvy. mltng. steel	.... 16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel	$10.50 to $11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.78c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Ch/cago, Gary or Birmingham	2.60c.
Del'd Detroit	2.70c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.53c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

	Base per Lb.
F.o.b. Pittsburgh	3.80c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.90c.
F.o.b. cars dock Gulf ports	4.20c.
F.o.b. cars dock Pacific ports	4.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.435c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5025c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.30c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	*$4.65
F.o.b. Gary	* 4.75
F.o.b. Granite City	4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate
(*F.o.b. Pittsburgh*)
(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$11.00
15-lb. coating I.C.	13.00
20-lb. coating I.C.	14.00
25-lb. coating I.C.	15.00
30-lb. coating I.C.	16.25
40-lb. coating I.C.	18.50

Hot-Rolled Hoops, Bands, Strip and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	74
Single loop bale ties, base col....	63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld			*Butt Weld*		
Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	52	31	⅛ & ¼	+13	+35
¼ to ⅜	55	38½	½	20	1½
½	59½	49	¾	26	8
¾	62½	53	1 & 1¼	30	14
1 to 3	64½	55½	1½	34	16½
			2	33½	16
Lap Weld			*Lap Weld*		
2	57	47½	2	26½	10
2½ & 3	60	50½	2½ to 3½	27½	12½
3½ to 6	62	52½	4	29½	16
7 & 8	61	50½	4½ to 8	28½	15
9 & 10	60½	50	9 to 12	24½	10
11 & 12	59½	49			
Butt Weld, extra strong, plain ends			*Butt Weld, extra strong, plain ends*		
⅛	50½	36½	⅛ & ¼	+14	+48
¼ to ⅜	52½	40½	½	21	4
½	57½	48½	¾	27	10
¾	61½	52½	1 to 2	34	17½
1 to 3	63	55			
Lap Weld, extra strong, plain ends			*Lap Weld, extra strong, plain ends*		
2	55	48½	2	29½	13½
2½ & 3	59	50½	2½ to 4	35	20½
3½ to 6	62½	54	4½ to 6	33½	19
7 & 8	61½	51	7 & 8	34½	19½
9 & 10	60½	50	9 to 12	28	15½
11 & 12	59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.73	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.62
2¼ in. o.d.	12 B.W.G.	19.37	17.21
2½ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	22.82
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	56.00
F.o.b. dock, Seattle	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller.	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quality. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lbs.
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	$2.35
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.30
3400 Nickel-chromium	3.30
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum).	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum).	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box 25s. to 25s. 6d.	
Steel bars, open-hearth.	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£18 15s.

CONTINENTAL

Per Metric Ton, Gold f. f.o.b. Continental Ports

Billets, Thomas	£4 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£4 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, ⅛ in.	£8 9s. 6d.
Beams, Thomas	£5 3s.
Angles (Basic)	£5 3s.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Per Net Ton

Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large 1 to 24 kegs	3.90c.

Per Cent Off List

Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO *Base per Lb.*

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

Per Cent Off List

Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	35
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.00 to 7.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.47c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

Per Cent Off List

Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS *Base per Lb.*

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel(squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

* No. 26 and lighter take special prices.

PHILADELPHIA

Base Per Lb.

*Plates, ¼-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
‡Reinforc. steel bars, sq. twisted and deformed	3.43c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c
*Black ann'l'd wire, per 100 lb	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List

Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI *Base per Lb.*

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles.	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload.	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

BUFFALO *Base per Lb.*

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON *Base per Lb.*

Channels, angles	4.20c.
Tees and zees, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes(mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.35c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60-5
1⅛ in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
½ in. and smaller	65
9/16 to 1 in.	60-5
1⅛ in. and over	50-10-5

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Structural shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

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* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.30c.
Cold-drawn flats, squares, hexagons	6.30c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.30
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.35c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.65	$3.60	$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

Fo.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.80
Ferrotungsten, lots of 5000 lbs.	1.85
Ferrotungsten, smaller lots	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrochromium, 2% carbon	16.50c. to 17.00c.*
Ferrochromium, 1% carbon	17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50*
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	47c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$23.50 to $25.50
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.50
Turkish, 48-49%	25.50 to $26.50
Turkish, 45-46%	23.50 to 24.00
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$24.50 to $25.00
48-49%	25.50 to 26.50

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	21.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke	*Per Net Ton*
Furnace, f.o.b. Connellsville, Prompt	$4.35 to $4.60
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal	*Per Net Ton*
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

NIAGARA FALLS, N. Y.

Sales Offices: NEW YORK—30 Church St. ● PITTSBURGH—Oliver Bldg. ● CLEVELAND—Hanna Bldg.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Summer lull is being felt, although ordering is fairly good.

o o o

. . . Export demand more lively than domestic.

o o o

. . . Some improvement in deliveries apparent.

Cincinnati

CONTINUED slack demand, although strike problems in other areas have eased, has convinced district machine tool builders that seasonal reactions are largely responsible for market conditions. Foreign ordering is better sustained than domestic. Inquiry, on the other hand, is holding to reasonable good levels, bringing encouragement for the immediate future. Heavy tools are resisting market decline more successfully than light machines.

With several plants making heavy inroads on backlogs, production is slower. Several plants have discontinued overtime work entirely, and night shifts are reduced. Deliveries are more prompt.

Cleveland

MACHINE tool business is limited to scattered orders for single tools, and there is little new inquiry. July sales with some dealers gained over June and with others fell off. A turret lathe manufacturer reports a good volume of business last month, although its July volume was only 75 per cent of that in June. Some single tool business is coming from railroads. Sales are expected to remain around present levels through August. Inquiry for machinery for export, which has been light for a few weeks, has again become quite active. Fresh inquiries for sizable lots have come from Russia, Japan and France. One lathe manufacturer, who has sold all the machines it has allocated for export during the remainder of the year, has taken some export business for shipment in the first quarter.

New York

JULY turned out to be much better than had been anticipated as a result of the low activity in the beginning of the month. More than one dealer and factory representative found his July totals equal to or only slightly below those of June. A leading dealer reported orders ahead of shipments for the seventh consecutive month this year. Other dealers found that absences of buying executives on vacations, and vacation closing of some plants had tended to make the month a dull one. All agree that inquiries are still in good volume and the prospects for further buying exceedingly bright. Lately the market has been featured by unsolicited inquiries that materialize into orders within a few days. These were for single tools, from a variety of sources.

Not much improvement is noted in delivery promises, except that manufacturers seem to be adhering more closely to their promises, indicating that production is under better control. Much equipment is being quoted for delivery next year. Some popular sizes of toolroom lathes, for example, are promised for as late as March.

No equipment inquiries have developed from Bendix subsidiaries, although the general contract was let two weeks ago for the buildings at Bendix, N. J., which are to be completed by November.

Chicago

INDUSTRIAL lists are infrequent at present, but small scattered orders are maintaining volume. Best demand is for special and production equipment, although standard tools are being sought in considerable volume also. Sales of small tools continue good. The long epidemic of strikes in this district and the resultant loss of income are having some effect on machine tool sales. Deliveries generally are unimproved. Allis-Chalmers is understood to have asked for tool designs for the fourth time suitable for production of the new tractor motor which has been under contemplation by this company for some time. Deliveries on this equipment earlier than December were said to be impossible. The Rock Island Arsenal would like to buy a 20-in. hydraulic shaper.

Detroit

THE small tool program and final die work for the automobile industry are keeping Detroit shops exceptionally busy for the first time this year. After a season that brought them very little business, they are now catching up, in a small way at least. Included in the jobs now being done are the dies for the American Bantam car. The Detroit Body Die Co. has received the order for fender dies on this small car. Inquiries and sales for machine tools are at their lowest ebb. Some new annealing furnaces have been sold in this area in recent weeks and installations of this equipment are about to be made. Well over $150,000 worth of machine tools are being put in the new apprentice school building just completed by the Pontiac Motor Car Co. It is believed that when Plymouth takes over the present Dodge plant, after Dodge moves to its new buildings northeast of the city, the Plymouth truck, heretofore built only in small quantities, will be put on larger production.

Pittsburgh

TO some extent both inquiries and new business are affected by vacation schedules, but a fair amount of activity continues. The apparent lull has by no means disappointed manufacturers whose backlogs are such that deliveries are in bad shape on most items. Indicative of the tremendous amount of unfilled orders in the electrical equipment phase of the business is the report of Westinghouse Electric & Mfg. Co. indicating unfilled orders on June 30 at approximately $84,000,000, the highest point reached since September, 1920.

U. S. Steel to Sell Canadian Properties

THE United States Steel Corp. has offered its Canadian properties for sale to the Dominion Steel & Coal Corp., Ltd., of Sydney, Nova Scotia, and the deal has been completed subject to ratification by stockholders of the Dominion company at a special meeting Aug. 12. The stockholders of the Canadian company will be asked to approve an increase of $2,000,000 in its authorized capital to cover the cost of the properties.

Subsidiaries of U. S. Steel in Canada are the Canadian Steel Corp., Ltd., Ojibway, Ont.; Canadian Steel Lands, Ltd., also at Ojibway; Canadian Bridge Co., Ltd., Walkerville, Ont., and the Essex Terminal Railway Co., which covers the Walkerville-Windsor district in western Ontario.

The plant of the Canadian Steel Corp. consists of equipment for the rolling of tin plate and sheets and drawing of wire, with annual capacity of 60,000 tons of tin plate, 30,000 tons of galvanized sheets, 26,800 tons of plain wire and smaller capacities for barbed wire, fencing, triangle mesh reinforcement, electric weld fabric reinforcement and chain link fabric.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Southern Alkali Corp., 30 Rockefeller Plaza, New York, has approved plans for addition to plant at Corpus Christi, Tex., for production of chlorine, consisting of three one and multi-story units. Completion is scheduled early in January, 1938. Plans also are under way for three similar buildings for new salt production division, with completion by March, 1938. Entire project will cost over $500,000. Company is a joint interest of Pittsburgh Plate Glass Co., Pittsburgh, and American Cyanamid Co., New York.

American Radiator Co., 40 West Fortieth Street, New York, has let general contract to Austin Co., 19 Rector Street, for one-story factory branch, storage and distributing plant at Newark, N. J., 89 x 385 ft. Cost over $75,000 with equipment.

Kelvinator Corp., Twenty-third Street and Fiftieth Avenue, Long Island City, New York, manufacturer of electric refrigerators, air-conditioning equipment, etc., with main plant at Grand Rapids, Mich., has leased four-story and basement building at Twenty-seventh Street and Pearson Place, Long Island City, about 60,000 sq. ft. floor space, for factory branch, storage and distributing plant.

Canada Dry Ginger Ale, Inc., 100 East Forty-second Street, New York, has authorized erection of four branch mechanical-bottling plants at Philadelphia, Pittsburgh, Omaha, Neb., and Winnipeg, Man., each to cost about $100,000 with equipment. Similar plant is planned on site in Texas, on which superstructure will begin this fall, to cost close to like sum.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 13 for about 16,000 lb. of iron castings (Schedule 1351) for Brooklyn Navy Yard; until Aug. 17, three electric arc welding sets (Schedule 1356) for Brooklyn and San Diego, Cal., yards.

General Electric Co., Schenectady, N. Y., has let general contract to E. E. Austin & Son, 1919 Reed Street, Erie, Pa., for one-story addition to branch plant on East Lake Road, Erie, for expansion in foundry. Cost over $50,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Aug. 23 for 806,000 lower detonator washers (Circular 36).

Public Service Electric & Gas Co., Terminal Building, Newark, N. J., has authorized expansion and improvements in steam-electric generating plant at Burlington, N. J., including new 100,000-kw. turbo-generator unit with auxiliaries, two high-pressure boilers, stokers, pumps and other equipment. Company also will build 16 mile transmission line to Trenton, N. J., and make extensions in power substation and switching station at that place. Project will include a new dock on Delaware River, adjacent to power plant, for coal deliveries, to include hoisting tower, conveyers, unloaders and other mechanical-handling equipment. Fund of $12,000,000 is being arranged for work.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 10 for 650 fuel quantity gage check valves (Schedule 1325), aircraft manifold pressures gages (Schedule 1300), 300 indicators, 350 switches, 350 switch leads, 2000 thermocouples, 1600 thermocouple leads (Schedule 1299), 750 aircraft sensitive altimeters (Schedule 1294), 650 non-magnetic aircraft tachometer shafts (Schedule 1319), 450 aircraft centrifugal tachometers (Schedule 1292); until Aug. 13, 550 aircraft engine gage units (Schedule 1336), magnetic contactor switches, solenoids and spare parts (Schedule 1353) for Philadelphia Navy Yard.

Harry H. Weymeyer, 509 West Cumberland Street, Philadelphia, has taken out a permit for one-story machine shop, on Fairhill Street. Cost over $25,000 with machinery.

Invader Oil Co., Ashburner Street and Pennsylvania Railroad, Philadelphia, plans new bulk oil storage and distributing plant. Cost close to $45,000 with steel tanks and other equipment.

Harrisburg Coca-Cola Co., 318 Carlisle Street, Harrisburg, Pa., has let general contract to O. C. Peers Co., Fort Hill Avenue, Richmond, Va., for new two-story mechanical-bottling plant, 100 x 180 ft., at Seventeenth and Holly Streets, Harrisburg, with one-story service and garage building adjoining for company trucks and cars. Cost close to $100,000 with equipment.

NEW ENGLAND

G. F. Wright Steel & Wire Co., 243 Stafford Street, Worcester, Mass., manufacturer of wire cloth, wire lath and kindred wire goods, has let general contract to E. J. Cross Co., 82 Foster Street, for one-story addition, 66 x 128 ft. Cost over $65,000 with equipment.

National Biscuit Co., 190 Albany Street, Cambridge, Mass., has let general contract to Aberthaw Co., 80 Federal Street, Boston, for addition and improvements to storage and distributing plant at Cambridge. Cost close to $85,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Aug. 20 for one portable box-type electric furnace for copper brazing and heat treatment, controlled atmosphere type (Circular 13).

Schick Dry Shaver, Inc., Atlantic Street, Stamford, Conn., manufacturer of electric razors, has let general contract to Vuono Construction Co., 1 Atlantic Street, for one-story plant unit, 50 x 150 ft. Cost over $50,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Miller Co., Center Street, Meriden, Conn., manufacturer of electric lighting fixtures, lamps, etc., has let general contract to Tremaglio Brothers, Waterbury, Conn., for one-story addition, 60 x 125 ft. Cost over $50,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Hartford Special Machine Co., 287 Homestead Avenue, Hartford, has awarded general contract to R. G. Bent Co., 93 Edwards Street, for one-story plant, 34 x 160 ft., to cost $10,000 without equipment. Greenwood & Noorr, 525 Main Street, Hartford, are architects.

Barbour Stockwell Co., 205 Broadway, Cambridge, Mass., has awarded contract for a machine shop addition, 46 x 83 ft. Lester C. Gustin, 88 Broad Street, Boston, is architect and builder.

BUFFALO DISTRICT

Automatic Voting Machine Corp., Jones Street, Jamestown, N. Y., has plans for one-story addition. Cost close to $50,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

Remington-Rand, Inc., 465 Washington Street, Buffalo, manufacturer of typewriters, office accounting machines and parts, office equipment, etc., has plans for one-story addition, 180 x 220 ft., at Tonawanda, N. Y., for production of steel filing cabinets and cases, and allied steel office specialties. Cost over $200,000 with equipment.

General Abrasive Co., College Avenue, Niagara Falls, N. Y., has plans for one-story addition, in part for expansion in crushing and grinding department, with remainder of unit for storage and distribution. Cost close to $50,000 with equipment.

WASHINGTON DIST.

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until Aug. 12 for steel radio antenna towers, complete with steel sub-base, shields, ladder, insulators, counterpoise, etc., in lots of 350 to 450 (Proposal 28722).

Engineering & Research Corp., Sligo Mills Road, Washington, manufacturer of airplane equipment and parts, has asked bids on general contract for new one and two-story plant, 200 x 300 ft., and 40 x 300 ft., respectively, with one-story shop unit and power house, at Riverdale, Md. Cost over $125,000 with equipment. Kubitz & Koenig, Emerson Tower Building, Baltimore, are consulting engineers.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 13 for two blowers, drills, taps, die stocks, pipe wrenches, engineers' wrenches, nail hammers, hacksaw blades, shovels and other equipment, including one prefabricated steel house (Schedule 3276); until Aug. 16, two traveling cranes, two litter carriers, steel shelving and other equipment (Schedule 3277).

E. I. du Pont de Nemours & Co., Inc., Curtis Bay, Baltimore, industrial chemicals, etc., has plans for five-story unit at 2001 Benhill Avenue, 55 x 75 ft. Cost over $85,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 10 for two deck winches with electric drive, control, brake and spare parts (Schedule 1277), nine electric-operated bench grinders, one motor-driven tool-post grinder (Schedule 1326) for Norfolk, Va., Navy Yard; machine screws and nuts, set screws and wood screws (Schedule 1268), one universal coil winder (Schedule 1297), 12 motor-driven hand shear machines (Schedule 1331), two oil-fired heating kettles (Schedule 1303), one motor-driven hollow chisel mortiser (Schedule 1296); until Aug. 13, vibrating, valve seat grinders, aircraft type (Schedule 1330) for Eastern and Western Navy yards; until Aug. 10, 12 ventilation blowers for general use on ship work (Schedule 1352) for Portsmouth yard.

SOUTH ATLANTIC

Florida Citrus Pulp, Inc., Barnett National Bank Building, Jacksonville, Fla., George H. Baldwin, president, recently organized, plans one-story plant at Tampa, Fla., for production of special pulp products, using waste from citrus fruits as raw material. Cost close to $40,000 with equipment. Similar plant is planned later at Bartow, Fla., to cost about like sum. W. E. Arnold is secretary and treasurer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 13 for 64 propellers for airplanes for Pensacola, Fla., Naval Air Station Proposal 900-1013).

White Packing Co., Salisbury, N. C., meat packer, has let general contract to L. S. Bradshaw, Salisbury, for new one-story plant. Cost close to $45,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Evans Metal Co., Atlanta, Ga., which has awarded contract for new plant, as mentioned in our July 22 issue, page 126, should be addressed at P. O. Box 97-North Side Branch, Atlanta, instead of 1063 Virginia Avenue, as stated in that item.

SOUTH CENTRAL

Waverly, Inc., Canal Bank Building, New Orleans, plans extensions and improvements in cane sugar mill at Thibodaux, La., recently acquired, with installation of clarifiers, tanks and other equipment. Power house will be remodeled and new boiler units and auxiliary equipment installed. Cost close to $80,000 with machinery.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Aug. 9 for one 400-kva. gasoline engine-operated generator unit and auxiliary equipment for power plant at Pickwick Landing Dam; until Aug. 17, metal-clad switchgear for same plant.

Standard Oil Co. of Louisiana, St. Charles Avenue, New Orleans, has let contract to Arthur G. McKee & Co., Cleveland, engineers and contractors, to design and supervise installation of new poly-

merization unit at oil refinery at Baton Rouge, La. Cost close to $500,000 with machinery. Company also plans expansion in bulk oil storage and distributing terminal at Mobile, Ala. Cost over $200,000 with tanks, pumping machinery and other equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 10 for six 1200-lb. and two 6000-lb. kedge type anchors (Circular 11); until Aug. 16, one heat exchanger (Circular 13); until Aug. 18, one crawler-type tractor with bulldozer (Circular 12).

SOUTHWEST

Anheuser-Busch, Inc., 721 Pestalozzi Street, St. Louis, has taken out permit for eight-story addition to brewery, 109 x 117 ft., for storage and distribution. Cost close to $1,000,000 with mechanical-handling, elevating and other equipment. Company will also expand and modernize present brewery, including installation of equipment. Cost about $3,000,000 in addition to sum previously noted.

Electric and Water Department, McPherson, Kan., L. C. Angerine, superintendent, asks bids until Aug. 10 for high-pressure boiler unit and accessory equipment for municipal power plant. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Buck X-Ograph Co., 8709 X-Ograph Avenue, St. Louis, manufacturer of X-ray equipment and parts, has asked bids on general contract for one-story addition for expansion in machine shop and woodworking division. Cost over $40,000 with equipment. Manske & Rotty, 506 North Vandeventer Street, are architects.

City Council, Rockport, Mo., plans erection of new municipal electric light and power plant. Bond issue of $90,000 has been authorized. Engineering Service Co., Railway Exchange Building, Kansas City, Mo., is consulting engineer.

McAllen Citrus Association, McAllen, Tex., has let general contract to Abbott & Hummer, McAllen, for one-story addition to citrus fruit packing plant. Cost about $35,000 with mechanical-handling equipment.

Deep Oil Development Co., Wichita Falls, Tex., plans new natural gasoline plant in Wichita Valley district, Wichita County, with compressor station and power house, steel tank storage and distributing department, pumping plant and other structures. Cost close to $100,000 with machinery.

WESTERN PA. DIST.

Aero Supply Mfg. Corp., West Main Street, Corry, Pa., manufacturer of screw products for aircraft, has plans for two-story addition, 75 x 85 ft. Cost close to $50,000 with equipment. Fred A. Fuller, Commerce Building, Erie, Pa., is architect.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until Aug. 10 for two steam-driven spud engines (Circular 20); until Aug. 16, one bulkhead crane, bulkhead and derrick for Tygart River reservoir dam, near Grafton, W. Va. (Circular 24).

American Bantam Car Co., Butler, Pa., organized several months ago to take over former plant of Austin Car Co., has completed financing and is arranging to begin operations in September. New equipment will be installed. Company will specialize in small coupe and roadster automobiles, also ¼-ton motor trucks, including parts and assembling. R. S. Evans is president.

OHIO AND INDIANA

Tool Steel Gear & Pinion Co., Township Avenue, Elmwood, Cincinnati, will take bids soon on general contract for one-story addition, 45 x 130 ft. A crane will be installed. Cost over $60,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects.

Kentucky Chemical Mfg. Co., 410 East Tenth Street, Covington, Ky., has plans for new works at Ivorydale, near Cincinnati, comprising four one-story units, 50 x 165 ft., 50 x 100 ft., 50 x 60 ft., and 40 x 40 ft. Cost over $85,000 with equipment. Hillsmith & Co., Chamber of Commerce Building, Cincinnati, are consulting engineers.

Cincinnati Shaper Co., Hopple and Garrard Streets, Cincinnati, is erecting one-story addition, 87 x 194 ft., for which general contract was let recently to Ferro Concrete Construction Co., Third and Elm Streets. Cost close to $75,000 with equipment.

Cleveland Chain & Mfg. Co., Broadway and Henry Streets, Cleveland, has let general contract to J. L. Hunting Co., Chester-Ninth Street Building, for one-story and basement addition, 70 x 225 ft. Cost about $85,000 with equipment. Herman W. Maurer, 3126 Scarboro Road, is architect.

Akron Metal Stamping Co., Inc., Akron, Ohio, C. F. Minnear, head, recently organized, is arranging for establishment of plant in local building, to be ready for service late this month.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 9 for six portable electric sanders and one portable electric grinder (Circular 38); until Aug. 10, one motor-driven engine lathe (Circular 37); until Aug. 13, acetylene hose, air hose, aircraft hose, oxygen hose, etc. (Circular 36); until Aug. 20, fuel pump assemblies in lots of 50 to 450 (Circular 32).

Strom Brass Foundry, 2636 South Main Street, Elkhart, Ind., manufacturer of brass, bronze and kindred metal castings, has let general contract to Donald Goshorn, 1605 South Morton Avenue, for one-story addition, 50 x 100 ft.

MICHIGAN DISTRICT

Pontiac Motor Co., Pontiac, Mich., has asked bids on general contract for one-story addition to building No. 9. Cost over $50,000 with equipment. Work will be carried out in conjunction with expansion program under way, to cost close to $250,000 for buildings and equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Baldwin Rubber Co., Pontiac, Mich., has plans for new steam power house. Cost about $35,000 with boilers and other equipment. L. J. Heenan, Pontiac, is architect.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has let general contract to Buesching-Hagerman Corp., 402 East Superior Street, Fort Wayne, Ind., for remodeling former works of Haynes Automobile Co. at Kokomo, Ind., recently acquired. Program will concentrate largely on main two-story unit for branch plant for Dodge Brothers Division, primarily for production of gears and transmission systems, axles and kindred equipment. Cost about $250,000 with machinery. Other sections of plant will be improved later. Entire project will cost over $500,000. Merritt Harrison, Architects' and Builders' Building, Indianapolis, is architect; Bevington-Williams, Inc., Indiana Pythian Building, Indianapolis, is mechanical engineer.

Lincoln Motor Car Co., 6200 West Warren Avenue, Detroit, has let general contract to J. A. Utley, 6031 Mansar Street, for plant alterations and improvements, including two new conveyer bridges, compressor station improvements and power substation unit. Cost over $50,000. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

MIDDLE WEST

Cribben & Sexton Co., 680 North Sacramento Boulevard, Chicago, manufacturer of stoves, ranges and parts, has let general contract to Larson & Gade, Inc., Chicago, for one-story addition, 140 x 192 ft., for general production and for storage and distribution. Cost close to $100,000 with equipment. Arthur Swanson, Mannheim Road, Desplaines, Ill., is architect.

Hamler Boiler & Tank Co., 6025 West Sixty-sixth Street, Chicago, plans rebuilding part of plant recently destroyed by fire. Loss over $250,000 with equipment.

Mechanics' Universal Joint Co., Eighteenth Avenue, Rockford, Ill., has plans for new one-story plant, 390 x 600 ft., with power house, 60 x 100 ft. Cost over $200,000 with equipment. Peterson & Johnson, Swedish-American Bank Building, are architects. Company is a division of Borg-Warner Corp., 310 South Michigan Avenue, Chicago.

Rural Co-operative Power Association of Minnesota, care of Federated Electric Co-operative, Inc., 739 Johnson Street, N.E., Minneapolis, Wendell W. Cutcliffe, engineer, plans new steam-electric generating plant near Maple Plain, Minn., for power supply to rural electric systems in that area. Cost about $200,000 with equipment. Financing has been arranged through Federal aid.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Aug. 20 for one to 25 engines for light tanks and combat cars, with spare parts (Circular 35).

Socony-Vacuum Oil Co., 1754 Rockingham Street, Davenport, Iowa, plans new bulk oil storage and distributing plant at Bettendorf, Iowa, including dock with barge unloading facilities, pumping station, steel tanks and other structures. Cost over $90,000 with equipment. Main offices of company are in New York.

City Council, Waverly, Iowa, plans extensions and improvements in municipal electric power plant, including diesel engine-generator units and auxiliary equipment. Cost about $185,000. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Sunlight Produce Co., 2118 Leech Avenue, Sioux City, Iowa, food packer, a subsidiary of Cudahy Packing Co., Chicago, has plans for one-story addition, 50 x 157 ft., superstructure to begin at once. Cost close to $50,000 with equipment.

Kurth Malting Co., South Forty-third and West Burnham Streets, Milwaukee, has plans by Lawrence E. Peterson, consulting engineer, 312 East Wisconsin Avenue, for malthouse addition, increasing total plant capacity by 1,500,000 bu. annually.

PACIFIC COAST

Bureau of Reclamation, Denver, asks bids until Aug. 12 for four motor-driven pumping units, each 250 gal. per min., for installation at Government camp at Friant Dam, Central Valley project, Cal. (Specifications 953-D).

General Motors Corp., South Gate, Los Angeles, has let general contract to Truscon Steel Co., 5480 East Slauson Avenue, for one-story addition to assembling plant, 80 x 220 ft. Cost over $75,000 with equipment.

Quartermaster Supply Officer, Fort Mason, San Francisco, asks bids until Aug. 9 for one steam turbine unit (Proposal 928-16).

Puget Sound Pulp & Timber Co., Bellingham, Wash., plans expansion in unbleached sulphite pulp mills, including group of one and multi-story buildings, adjoining present plant. Cost about $2,600,000. Financing is being arranged through sale of preferred stock.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 10 for one motor head variety saw bench (Schedule 1287) for Mare Island Navy Yard; one motor-driven metal-cutting hacksaw (Schedule 1314), two hand-operated hydraulic pumps, 6000 and 8000-lb. pressure, respectively (Schedule 1311) for Puget Sound yard.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 11 for new graving dry dock at Mare Island Navy Yard, Cal., including crane tracks, capstan and bollard foundations, piping, railings, dock fittings, etc. (Specifications 8258).

Pacific Distilleries, Inc., Culver City, Cal., has plans for one-story addition for expansion in fermenting department. Cost close to $30,000 with equipment. Arlos R. Sedgley, 910 North Serrano Avenue, Los Angeles, is architect.

United States Engineer Office, Bonneville, Ore., asks bids until Aug. 17 for six radial gate hoists, one fish gate hoist, 51 diffusion gate hoists, 12 regulating gate hoists and 15 weir water supply gate hoists for fishways operating machinery for Bonneville Dam Project (Circular 11).

Seattle Iron & Metal Co., 2400 Colorado Avenue, Seattle, has leased property, 120 x 330 ft., at Colorado and Utah Avenues, for one-story storage and distributing plant, with hoists, conveyers, loaders and other mechanical-handling equipment.

FOREIGN

Consett Iron Co., Ltd., Consett, Durham, England, producer of pig iron, is at head of project to organize company with capital of $5,000,000, to build a steel plant at Jarrow, Durham, about 20 miles from Consett. Cost close to $2,000,000 with machinery. Nuffield Trust, Ltd., and Bankers' Industrial Development Co., Ltd., both London, are interested in project and will be active in financing plans.

Cost Control in a Gray Iron Foundry

(CONTINUED FROM PAGE 55)

systems be widely different, only one system may be correct, and all the others are wrong.

A system embodying the principles that have been adopted by experienced firms, which obtain consistently comparable figures that can be interlocked (without discrepancy) with the financial accounts of the undertaking, can be considered as a sound system. It has been the object of this study to elaborate a system based on the best current practice in use by the most up-to-date foundries, and thus to propose a standard set of costing principles which can be adapted to the requirements of various types of foundries, and acceptable to the industry as a whole.

Fundamental Principles

Three fundamental principles form the basis of the whole system:—

(A) So far as is practically possible, *any expense, including oncosts, incurred in making a job should be a direct charge against that job; in other words, each job should be charged with its full cost, including its proper share of overheads.* As a result, overheads should be broken up and allocated in a fair proportion to the various jobs undertaken.

(B) *The undertaking should be divided into a number of departments,* and where a variety of castings is made it is necessary, in each department, *to classify the various grades of metal, and the various types of castings or cores.*

The division of the undertaking into departments makes for a more clear-cut and intelligible system, which makes it easier to trace any potential source of waste or condition of inefficiency. Further subdivision within each department enables the various factors of expenditure to be allocated in such a way that each class of castings will bear its proper cost in conformity with principle (A).

The division into departments and sections does not necessarily entail endless classification of all physical objects; it is mainly a classification on paper, by means of well-thought-out forms and cost sheets, which, once adapted by the management to a particular undertaking, forms the basis of normal clerical work. The classification will be more or less extended in accordance with the circumstances of each undertaking, and, generally speaking, the smaller the foundry the more simple will be the application of the system.

(C) The third principle is equally important as the two first ones, and embodies the methodical and correct keeping of all necessary records and inventories, covering such items as stocks of raw materials, supplies, partly-finished and finished castings, scrap, issues from stores, daily cast reports and records of weights charged into the cupola, job cards, records of wages and times, etc.

Such records and inventories are essential as it is from these that the figures constituting costs are extracted; they are the foundation of the whole system. If records and inventories are not properly kept, then the whole cost system, however sound it may be and however scientifically it may be built up, will give incorrect results—in just the same way that an adding machine will give an incorrect result if the wrong key has been tapped.

Divisions of the System

The manufacture of a casting, owing to its very nature, is the result of a number of definite processes. The metal must be melted; molds must be prepared in which the metal will be cast; in a large number of cases, cores must be made and placed in the mold. Finally, before being dispatched, gates, heads and risers must be removed from the casting, which must have a clean appearance and generally pass inspection. Each of these stages involves a special type of labor and should bear a certain quota of overhead charges or oncosts, besides the actual cost of the labor expended on the particular job.

In applying the principle of classification already enunciated, it is, therefore, natural to divide the undertaking into departments corresponding to those stages. This division enables costs to be checked at each stage, provides for a fair allocation of costs to different types of castings, and also permits of a closer control of the working of each department.

The four main divisions of the system, which apply to any gray iron foundry, correspond to the following departments:

I—Melting department.

II—Molding department.

III—Core department.

IV—Cleaning and fettling department.

In addition, there are a certain number of auxiliary departments that contribute to the proper functioning of the main divisions listed above. Among the most usual auxiliary departments are: The pattern shop, maintenance department, heat, light and power, dispatch, etc. In the smaller foundries these auxiliary departments need not all be considered separately, but in an undertaking of a certain size, their use clarifies the costing system and enables a better control of operations to be effected.

Melting Department

The object of the system, as applied to the melting department, is to arrive at the *cost of the metal at the spout per ton of good castings produced.*

Both for the purpose of estimating a selling price and for calculating actual costs over a period of time or for a given order, the value or cost of all of the following factors that are involved in the operation of the melting department must be known, by means of the properly-kept records and inventories:

(*a*) Price of the various brands of pig iron and alloys.

(*b*) Cost value of home scrap.

(*c*) Price of bought scrap.

(*d*) Price of coke.

(*e*) Price of limestone.

(*f*) Price of ganister, bricks, supplies and tools.

(g) Wages of all labor employed in the melting department.

(*h*) Cost of repairs and maintenance of melting plant.

(*i*) Cost of power for blowers and other mechanical devices requiring power.

(*j*) Other departmental oncosts which, according to the circumstances of the case, should be

charged to the melting department, such as cranes, hoists, whole or part of laboratory expenses, etc.

(*k*) Percentage of fixed charges, which in certain cases should be charged to this department.

The price of items (*a*) and (*c*) to (*f*) should be the price actually invoiced for the materials "delivered at the yard." Any depreciation of stock should be entered into a special account and charged against the stock account of the particular item.

The following records must also be carefully kept:

(A) Inventories of the stocks of pig iron, alloys, returned scrap, bought scrap, limestone, ganister, etc.

(B) Weight of each charge going into the cupola, each component being weighed separately.

(C) Weight of gates, runners, risers, wasters, overrun, etc., which return to the stock of home scrap.

(D) Weight of good castings, obtained from the foundry, cleaning and dispatch departments, including foundry tackle made.

(E) Daily cast report.

Loss of metal in melting and handling will be calculated from the above records.

The costs of the melting department comprise (1) cost of metal, (2) cost of melting, and (3) oncosts.

Cost of Metal

The customer should be charged with the actual cost of the metal going into good castings delivered, plus the cost of metal losses arising from the making of those castings. He should not be charged with the cost of the metal going into the scrap returned to stock, exception being made for high-priced additions. In that case, the total cost of the alloys should be charged, except when the alloy scrap can be used again for a similar type of casting, in which case an allowance should be made, proportionate to the value of the alloy present.

The metal costs include the cost of pig iron, bought scrap and home scrap, and of any additions (ferros, nickel, etc.) that are charged into the cupola or into the ladle. The cost of pig iron, additions and bought scrap are obtained from the corresponding inventories. The cost of home scrap will be the average (mean) cost of the pig iron and bought scrap that go into the charge in the proportion in which they are charged, or, in other words, the cost of the purchased metal going into the mixture.

The cost of metal can be worked out (*a*) directly for the actual tonnage of good castings produced, in which case the cost of metal losses must be added and calculated on the whole charge; (*b*) for the total tonnage of metal charged into the cupola, which will include metal losses, in which case the cost of the scrap returned must be deducted at the same value as the metal mixture. The cost, divided by the tonnage of good castings produced, gives "the cost per ton of the metal mixture going into good castings."

Metal costs should be classified as between the various mixtures that may be used in the foundry. Scrap returned from these mixtures should be stocked separately and used only in conjunction with the mixture from which it originates. This is particularly important in the case of mixtures containing alloys.

Cost of Melting

The customer should be charged with the total melting costs applying to all the metal charged into the cupola for making up his order. Whereas in the case of metal costs the customer is charged only with the cost of the metal going into good castings delivered, plus metal losses, in the case of melting costs he must also be charged with the cost of melting the scrap that is returned to stock, that is, gates, runners, wasters, over-run, etc., otherwise that cost will not be recovered.

The melting costs include primarily the following items:—All labor employed in the melting department and stockyard attached thereto, cost of coke, power, materials (limestone, ganister, etc.).

Whether the yield of good castings produced is large or small, melting costs are incurred for all the metal melted; castings should, therefore be classified on the basis of the production of good castings to metal melted, consideration being given to the relative weight of runners, risers, etc.; the castings should be classified accordingly on the cost sheets, and each class costed separately. The number of classes depends upon the conditions of each undertaking.

To determine melting losses for the various classes of castings, the aggregate tonnage of good castings produced and of all scrap produced in each class should be deducted from the weight of the metal mixture charged into the cupola. The remaining figures will give the melting losses. A general check can be obtained by taking the aggregate stock of pig iron and of scrap existing at the beginning of the period of costing, plus purchases, and deducting from this tonnage the stock of pig iron and scrap existing at the end of the period plus the tonnage of good castings produced.

Oncosts

A distinction should be made between departmental oncosts, which apply direct to the melting department, and fixed charges, a share of which is charged to this department. Departmental overheads in the melting department consist mainly of supervising, plant repair and maintenance, laboratory expenses and plant depreciation. The salary of any employee whose time is given to the melting department should be charged to that department.

Plant repair and maintenance covers the cupola plant; cranes and hoists used for the operation of the melting department, which includes the stockyard, blowers, electric gear, etc.

Laboratory expenses must be charged according to circumstances. If a laboratory is used exclusively for cupola control and metal analysis, it should be charged to the melting department. If a laboratory is also used for testing sands, for mechanical tests on castings, for micrography, etc., it should be possible to break up the laboratory expense between the melting department and the foundry, each bearing a share as a departmental oncost.

Melting plant depreciation is, obviously, a departmental overhead and should be added to cost of metal. Fixed charges in the melting department comprise a share of rent or depreciation of buildings, insurance, and local taxation, in proportion to the floor space occupied by the melting plant and the stockyards (pig iron, scrap and coke).

Departmental oncosts and fixed charges are allocated to the various classes of castings in a similar way to melting costs. In each class, the total of melting costs and oncosts, divided by the tonnage of

New Industrial Literature

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ROTARY PUMPS.—Roots-Connersville Blower Corp. Two new bulletins describing heavy duty rotary pumps adapted to handling liquids such as tar, asphalt, molasses, etc., and also the application of these units as exhausters for priming larger centrifugal pumps. Include engineering data relative to installation. Bulletin 8-10.

AUTOMATIC CONTROLS.—Mercoid Corp. Spiral bound sales brochure devoted to thermostats, line safety controls, limit and low water controls for steam boilers, and sealed mercury contact switches. Bulletin 8-11.

METAL LATH.—Metal Lath Mfg's. Association. Booklet No. 3 in a series of informative discussions on metal lath and its uses. Photographs show how metal lath protected lumber will confine fire to room of origin for more than one hour. Bulletin 8-12.

READING GLASSES.—Bausch & Lomb Optical Co. Folder illustrates new types of hand reading glasses. Includes prices and dimensions. Bulletin 8-13.

ANNEALING PRACTICE.—Surface Combustion Corp. Six different forms of radiant tube annealing covers for sheet strip, rod, and wire, are illustrated in this booklet. Blueprints and photographs give construction details and dimensions. Also describes atmosphere gas preparation units. Bulletin 8-14.

WASTE MATERIAL.—National Association of Waste Material Dealers, Inc. June issue of National Waste Review, house organ of the waste dealers. Features a reprint in full of the proposed Wage and Hour Bill, H.R. 7200. Bulletin 8-15.

CAULKING COMPOUND.—Truscon Laboratories. Bulletin announcing a new caulking compound that is non-bleeding, non-staining, non-sagging and non-crumbling. Photographs of large buildings waterproofed with this compound included. Bulletin 8-16.

NIBBLERS.—Andrew C. Campbell Division, American Chain & Cable Co., Inc. 8-page folder explains how nibblers can be applied to cutting odd shapes of ferrous or non-ferrous metals on a production basis. Bulletin 8-17.

ROD STRAIGHTENING MACHINE.—American Foundry Equipment Co. Bulletin describing rod straightener and shear machine designed for reclaiming bent rods, bolts, wire, nails, strip stock, etc. Material is straightened by alloy dies which strike work on four sides simultaneously. Operates on compressed air. Bulletin 8-18.

WIRE AND CABLE.—American Brass Co. Revised data sheets on square and rectangular bare copper wire and cable. Includes prices and extras. Bulletin 8-19.

ALLOY, TOOL AND HIGH SPEED STEELS.—Crucible Steel Co. of America. Stock book containing a complete listing of alloy and machine steels, and more than 50 grades of tool and high speed steels available for immediate delivery. Includes tables, weights, etc. Bulletin 8-20.

CAP AND SET SCREWS.—Holo-Krome Screw Corp. Folder listing sizes and prices. Screws are available in aluminum, duralumin, stainless steel and other materials. Also describes stripper bolts. Bulletin 8-21.

CONVEYOR AND TRANSFER EQUIPMENT.—Timken Roller Bearing Co. Revised edition of conveyor section of Timken Engineering Journal. Presents suggested layouts for all types of belt and pan conveyors, including live, idler, return and concentrator rollers. Table of approved loads and fitting practices for bucket and pan conveyor wheel bearings is included. Bulletin 8-22.

POWER PLANT EQUIPMENT.—Duraloy Co. Bulletin covers the application of chrome-iron, chrome nickel and nickel-chrome alloys to power plant equipment as a means of providing added heat, corrosion and abrasion resistance. Bulletin 8-23.

WET SAND CLEANING.—Hydro-Blast Corp. Booklet describing and illustrating method of applying wet sand cleaning to steel and large gray iron castings. Drawings show typical installation, and many types of castings being cleaned by Hydro-Blast systems, together with time required for cleaning, are also shown. Bulletin 8-24.

HORIZONTAL MERCURY VAPOR LAMPS.—General Electric Vapor Lamp Co. An illustrated booklet presenting information on improved Cooper Hewitt vapor lamps which may be hung horizontally instead of sloping as previously required. Gives photometric ratings for 275 and 350 watt lamps. Bulletin 8-25.

ACCIDENT FACTS.—National Safety Council, Inc. Annual review of the characteristics of the past year's national accident experience. Includes facts on all types of accidents, including motor vehicle, industrial, aviation and railroad. Bulletin 8-26.

HIGH TENSILE AND STAINLESS STEELS.—American Rolling Mill Co. Two folders, one describing high tensile steel, and one covering chromium-nickel grades of stainless steels. Charts show physical and chemical properties, and photographs illustrate typical applications. Bulletin 8-27.

ENGINEERING MATERIAL.—E. I. DuPont de Nemours & Co. Neoprene, a rubber-like engineering material which resists deteriorating effects of oil, heat, sunlight, chemicals and oxidation, is described in this handbook. Specific applications, including hose, cable, sheet goods and gaskets are also described. Comparison with rubber is included. Bulletin 8-28.

HOSE.—Electric Hose & Rubber Co. 64-page catalog devoted to descriptions and prices of braided and molded hose. Information is indexed according to purpose and type. Bulletin 8-29.

GROUND SHAFTING.—Bliss & Laughlin, Inc. Folder picturing the various operations required to turn out drawn, ground and polished, and turned, ground and polished shafting. Shows how close tolerances are maintained and high polish secured on the bars produced by the company. Bulletin 8-30.

BLAST CLEANING.—Pangborn Corp. Folder describing airless "Rotoblast" cleaning equipment and illustrating various applications in foundry cleaning rooms. Other catalogs are available on dust collectors, sand blast rooms and blasting equipment. Bulletin 8-31.

MOLDING MACHINES.—Tabor Mfg. Co. Bulletin describing cantilever jar squeezing machines for production molding. Outstanding feature is the tripod yoke which eliminates tendency of ramming head to shift sidewise, and insures equalized squeezing pressures. Bulletin 8-32.

WIRE CLOTH AND SCREENING.—John A. Roebling's Sons Co. Revised pages for insertion in its Woven Wire Fabrics Division catalog. New specifications use wire decimals commonly adapted by the industrial wire cloth industry, instead of the Steel Wire gage previously used. Bulletin 8-33.

If you want your new catalog or literature listed here send a copy to above address

good castings produced, gives a cost per ton, which, added to the cost per ton of the metal mixture, gives the "total cost of the metal at the spout per ton of good castings produced."

Application of the System

Cost of metal: For each mixture the cost of metal is calculated as shown in Table I.

Cost of melting and oncost: The various items of cost of melting and oncost are added up for a period of costing, as in Table II.

The castings are divided into classes corresponding to the yields of good castings to metal melted. As the melting costs and oncost increase in proportion to the tonnage of metal melted, the total amount (B) of these items of cost should be divided between each class of castings proportionately to the tonnage of metal melted in each class: it is then a simple matter to divide the melting costs and oncosts in each class by the tonnage of good castings produced in each class, and arrive at a cost per ton of good castings produced.

If a certain job is made from mixture A and comes under Class No. 2, for example, 65 to 70 per cent yield of good castings to metal melted, the cost per ton of good castings of the metal mixture A is added to melting costs and oncost per ton of good castings pertaining to Class No. 2, and the result gives "the cost of the metal at the spout per ton of good castings produced" for the job.

Direct Costs

Direct costs are those which can be charged specifically to a job. In order to conform with the first fundamental principle—namely, that "an expense incurred for a job should be charged to that job"—one should aim at bringing in as much as possible under the heading of "direct costs." Items which must be considered under this heading are labor, molding boxes, patterns and tackle when specially made for a job, and certain consumable materials wherever it is possible that such materials can be charged direct to the job. In order to apply the principle that wherever possible costs should be applied direct to their specific job, each job should be timed so that the correct amount of direct labor costs can be charged to the job.

Furthermore, in order to be able to apply the correct share of overhead costs to each job, castings should be classified in the molding department in accordance with the method of preparing the mold; therefore, a distinction should be made between machine-made molds, hand-made molds, loam molding, dry-sand molds, green-sand molds, and there should be corresponding divisions in direct labor costs when making up the periodical cost sheets. In certain cases the molding machine section should be subdivided into subsections in accordance with the type of machine used.

Molding boxes: In accordance with one of the fundamental principles of the system, whenever molding boxes are made for a specific job, their actual cost, less scrap value, must be considered as a direct charge against that particular job. Any other boxes, purchased or made in the foundry and used for general purposes—that is to say, those that are not used for a specific job—should be debited at cost to a "box part account." This account should be liberally depreciated and the depreciation charged to the molding department as a departmental overhead. This account should be credited with the scrap value of discarded boxes at the time they are scrapped.

Foundry tackle: This is treated in the same way. When made for a specific job it is charged to the job; when made for general purposes, it is debited to a special account and literally depreciated.

Patterns: The same principles apply to patterns as those established for molding boxes; patterns made for a specific job should be charged against the job. The method of establishing pattern costs is explained in a special section dealing with the pattern shop considered as an auxiliary department.

Materials: Such materials as chaplets, sprigs, wires, etc., should, whenever possible, constitute a direct cost against the job. When this can be done, such materials should be the subject of a stores issue, against an identification such as an order number, which insures their direct charge to the specific job. In other cases the charge is to be entered against the foundry.

Indirect Costs

Indirect costs cover costs which, by their very nature, cannot be ascribed directly to any particular job. Indirect costs comprise: Indirect labor, molding sand, miscellaneous supplies and tools, repairs, etc., and a share of general overhead expenses. As many separate accounts as possible should be kept, in order to enable costs to be properly analyzed. A list of some such items is given at the end of this section.

Indirect labor: This account covers the wages of all labor employed in the molding department that cannot be accounted for under the heading of "direct labor"; it includes the wages of men occupied in the sand mixing and reclaiming plant, the wages of men in charge of mold drying stoves, the wages of men in charge of repairs. The wages of men whose duties are divided between the molding and another department should be divided in proportion to the time spent in each department.

Molding sand: New molding sand is included in this account. Labor employed in the sand preparation plant for reclaiming used sand, and depreciation and maintenance of sand plant, are to be charged against the molding department in the "departmental overhead" account. In some cases, the sand preparation plant can be considered as an auxiliary department, the total cost of which is charged as a departmental overhead of the "molding department"; this procedure enables a better control of the cost and efficiency of the sand preparing plant to be effected.

Miscellaneous supplies and tools: In general, the cost of plumbago, blackings, etc., and loose tools should be spread over the molding department. In foundries that are divided into separate sections, these costs should be allocated between the various sections, bearing in mind the general principle that "a charge incurred for a job should be a direct charge against the job": for instance, spare parts or tools used specifically in conjunction with molding machines should be charged to the machine molding section. Special tools used for loam molding should be charged against that section.

In accordance with the same fundamental principle, fuel used in the mold drying stoves should be a charge against the dry sand molding section, as well as the maintenance and depreciation of the stoves. Again, as far as possible, chaplets, sprigs, wires, etc., should be charged against the job for which they are used. As previously stated, whenever materials can be

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PITTSBURGH, PENNA., July 15—"Piping requirements in steel plants are on such a vast scale that many minor items, small in individual units but large in the aggregate, are often overlooked," said an expert in steel plant equipment here today.

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TABLE I

Cost of Metal (Mixture "A")

	40 tons of	pig iron (*a*) at $20 per ton	$800.00
	20 tons of	pig iron (*b*) at $18 per ton	360.00
	20 tons of	bought scrap at $12.50 per ton	250.00
	80 tons	average price, $17.62½ per ton	$1,410.00
	40 tons	home scrap at $18 (average price)	720.00
Iron melted	120 tons	total cost of mixture	$2,130.00
	35 tons	less scrap returned at $18	630.00
Iron used	85 tons	cost of metal going into good castings	$1,500.00 (A)
		Tonnage of good castings produced (67½ per cent of total melt)	81 tons (T)
		Cost of metal per ton of good castings produced $\frac{A}{T}$	$18.52
		Metal loss (for reference) 3.33 per cent of total metal.	

NOTE: *The above items and figures are taken at random and for the purpose only of illustrating the application of the system.*

TABLE II

Cost of Melting and Oncast

Labor, charging, etc.	wages book	$40.00
Coke, limestone	price as per inventory	80.00
Plant maintenance and repairs (labor and materials)	at cost	25.00
Ganister, supplies	price as per inventory	22.50
Supervision	pay roll	7.50
Light, power	measured or estimated	12.50
Share of fixed charges (rent, rates, depreciation, etc.)	allocated on floor space, etc.	17.50
		$205.00

(Iron melted, 120 = $1.71 per ton of metal melted.)

Good castings produced, 81 tons (67½ per cent of melt) = $2.53 per ton (Class No. 2).

NOTE: *The above items and figures are taken at random and for the purpose only of illustrating the application of the system.*

charged direct to a job this should be done. The safest way to insure that all such supplies are accounted for is to charge them against the molding department at the time they are issued from stock, and a proper system of stores issuing and accounting, with direct charging wherever possible, should be instituted.

Repairs: Unless men are fully employed in doing repair jobs, labor costs for repairs are included under the general heading of "indirect labor." All materials and spare parts used in the repair of molding equipment and of ladles are to be charged as a departmental overhead against the molding department, or its various sections, *pro rata*. In the larger undertakings, repairs and maintenance of plant and equipment may constitute a separate auxiliary department: in such cases the costs of this auxiliary department are classified and allocated to the four main departments and their respective subsections as departmental overheads.

Foremen, clerks, etc.: In those undertakings where a number of foremen and clerks are fully employed in the molding department, their salaries constitute a departmental overhead.

Heat, light and power: These items of expenditure can be measured or closely estimated in proportion to their utilization by the various sections of the molding department. Heat and light can be allocated on a floor basis; power can be allocated on the basis of consumption of the various plants utilizing power. This is a departmental overhead. In those undertakings which operate their own power plant, these items constitute an auxiliary department, in which the cost per unit of the medium of power can be determined. This cost is then allocated on the basis established in the preceding paragraph.

Fixed charges: These include rent, rates, taxes, depreciation of buildings and plant, insurance, etc. For depreciation and insurance of buildings, a departmental factor can be worked out on a floor basis. Depreciation of plant and equipment should be computed on the basis of value and probable life of each kind and type of plant. Rent, rates and taxes are worked out on a floor area basis.

An allocation should be made at the beginning of each year for each department or section of the undertaking. All items of general expense that can be definitely allocated to the molding department should be so charged. Such items of general expense that cannot be divided between the various departments of the undertaking, such as administration expenses, social charges, selling costs, outward freight, financial charges, bad debts, etc., are dealt with at a later stage.

Ed. Note—Next week this report will be concluded with discussions of overheads in the molding department, cost control in the core department, pattern shop, cleaning and fettling departments and general overheads.

Acme Steel Co. Chicago, for the June quarter reported net profit of $669,441, after all charges, including estimated surtax on undistributed profits. This was equal to $2.04 a share on the capital stock and compared with $1,094,941 or $3.33 a share in the first quarter of 1937 and $513,774 or $1.56 a share in the June quarter of 1936. The indicated net profit for the first six months this year was $1,764,382 or $5.37 a share as compared with $905,627 or $2.76 a share the first six months of 1936. Earnings for the 12 months ended June 30 amounted to $3,014,251 as compared with $1,741,024 in the preceding 12 months.

The Interstate Commerce Commission has announced suspension until Feb. 22 of tariffs proposing increased rates on wrought iron and steel pipe from points in Ohio, Pennsylvania and West Virginia to points in Texas moving by rail and ocean. Rates on other iron and steel products included in the tariffs were allowed to become effective over the protests of steel producers.

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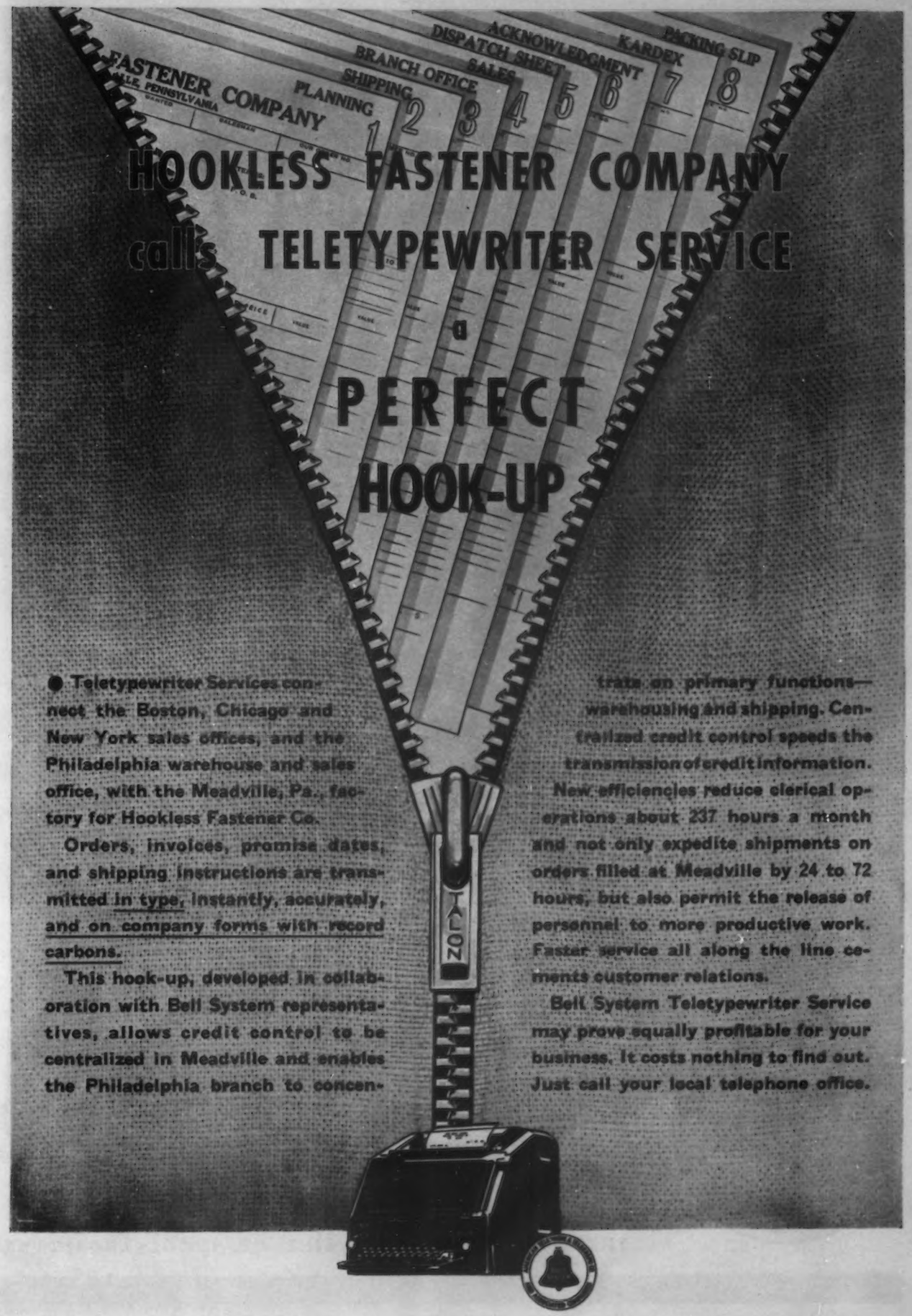
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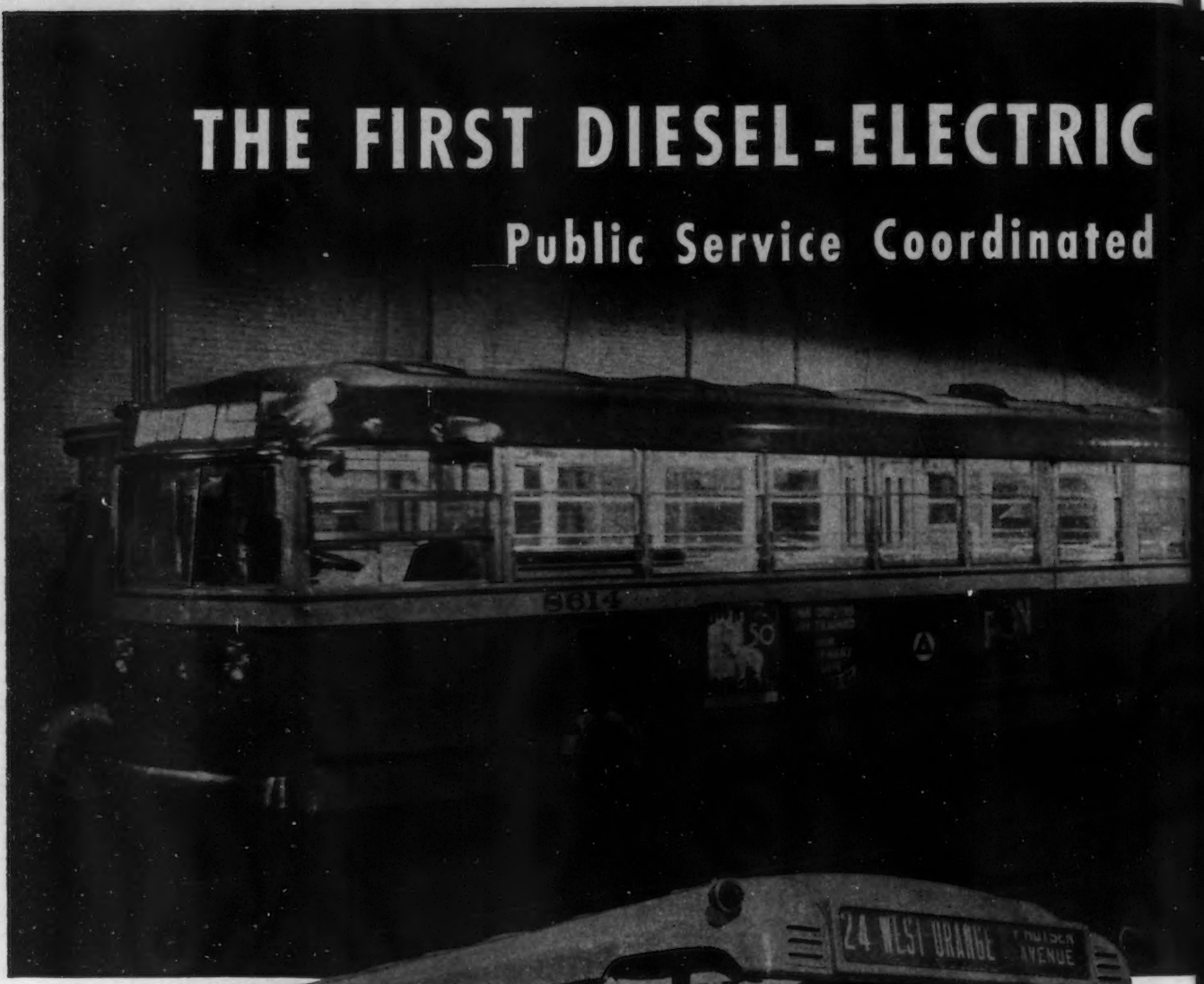

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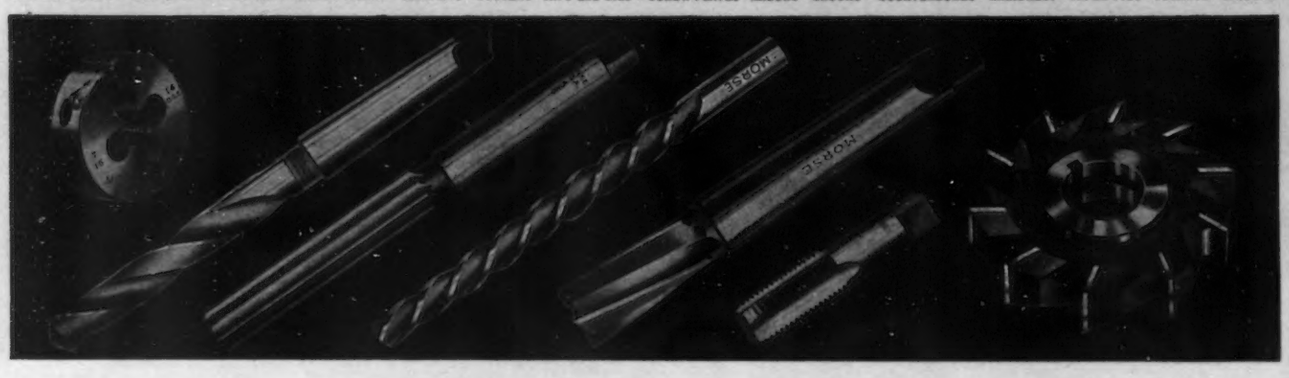

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Forgings reduce it in mobile equipment

● Numerous parts of your equipment may be as bulky as the watch of the '80's. This needless dead weight may be losing you valuable business. Twenty units of equipment... trucks, tractors, excavating machinery ... each with only fifty pounds of unnecessary tare weight means an annual loss to the operator of over $1000. For every pound of dead weight increases operating expense one dollar per year.

Don't let unnecessary tare weight interfere with your sales. A competent forgings engineer will be glad to advise the simplest way to replace bulky parts with forgings. A manufacturer of road building machinery increased the use of forgings in his equipment from four to over thirty after a similar check-up. Forgings not only reduce dead weight, but increase strength and stamina. Give your equipment the benefit of forgings.

"Drop Forging Topics" is issued several times yearly. It is sent free upon request. Send your name and address if you are not now receiving it, and copies will be regularly sent you.

THERE ARE NO SUBSTITUTES FOR FORGINGS

DROP FORGING ASSOCIATION

605 Hanna Building • Cleveland, Ohio

SYMBOLIC EMBLEM OF THE DROP FORGING ASSOCIATION

This identifies members of the Association

A GALVANIZED SHEET YOU CAN PAINT *Immediately*

Here's important news for users of galvanized sheets.

A revolutionary new sheet has been developed by Parker chemists and Armco metallurgists which needs no etching or weathering before painting. You can paint it immediately after fabrication and the paint will hold firmly without blistering or peeling.

Forming qualities are unaffected, and soldering practices remain practically unchanged. This new galvanized coating has a unique surface film that prevents the zinc from coming into direct contact with the paint, thus preserving the paint's flexibility and lengthening its life.

Parker and Armco research have given you the long sought answer to your problem of immediately painting galvanized products or construction.

These new galvanized sheets are now being supplied by the American Rolling Mill Company under the name of Armco "Paintgrip". Write for complete information.

PARKER RUST-PROOF COMPANY • 2186 E. MILWAUKEE AVE. • DETROIT, MICH.

Ask for These Books

For more than 22 years, this company has devoted its entire time, talent and energy to the improvement of rust-proofing methods. New books describing the Parker Processes are available to manufacturers and technical men. Send for your copies.

PARKER *Processes* **CONQUER RUST**

BONDERIZING · PARKERIZING

IT'S BY

The Finest Universal Shielded Arc Welding Rod of the Penetrative Type Ever Offered

THE NUMBER IS

3100

WELDABILITY

A visible arc—the operator can observe location and penetration of arc. Crater is free of slag. A light slag covering, easily removed. An extremely stable arc (more stable than any rod offered today).

PHYSICAL DATA

Yield PSI	**48,000 to 62,000 lbs.**	**Elongation % in 2"**	**20 to 30**
Ult. Strength	**60,000 to 75,000 lbs.**	**Specific Gravity**	**7.80 to 7.85**

FOR

Una-form results

UNA WELDING, INC.,
1516 COLLAMER AVE.,
CLEVELAND, OHIO.

☐ We would like to have your representative call.

FIRM NAME .....

ADDRESS .....

CITY..... STATE.....

LOST.. IN A FOG OF FIGURES

NOW, more than ever, business wants all the *clear* and *useful* figures it can get. Prompt, accurate figures that keep coming along without interruption are the surest help to clear business vision.

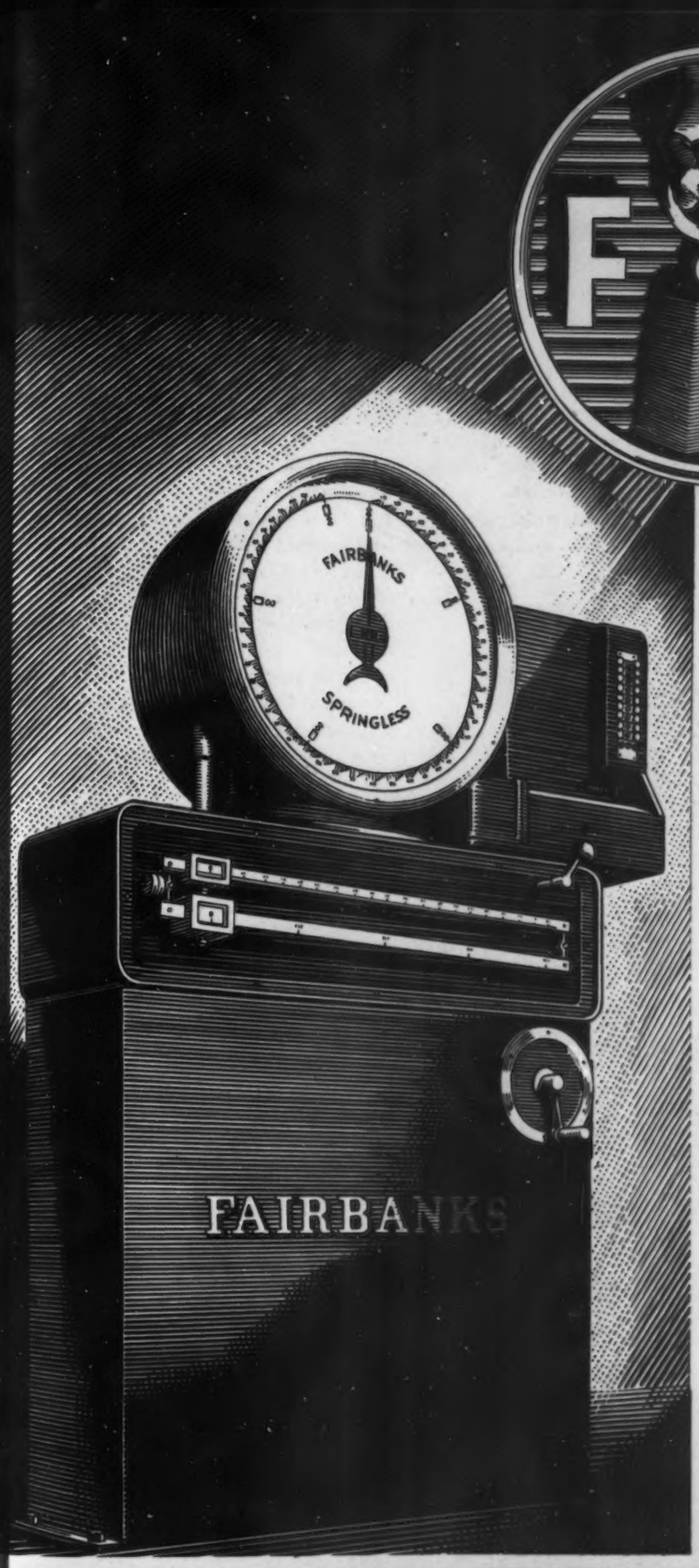
Monroe's whole function for twenty-five years has been to clear up business figures—to turn them out as simply, quickly, and cheaply as they can be produced. Today, Monroe offers a machine for every kind of figuring—adding-calculators, adding-listing, bookkeeping, and check writing machines.

MONROE

NEW
ADDING-CALCULATOR
Model MA-7

Series 3 Shortcut Dials, Electric Dials Clearance, Electric Carriage Shift.

One of the 150 Monroe branch offices is near you. Call up and ask to see a "Velvet Touch" Monroe at work on your own figures. There will be no obligation. We will also gladly send you descriptive literature on request. Just drop a line to the General Offices. Monroe Calculating Machine Co., Inc., Orange, New Jersey.



REPLACE

INACCURATE EYES AND FORGETFUL PENCILS WITH

F-M

PRINTOMATIC WEIGHERS

● Weight records can be perfect. The Fairbanks Printomatic Weigher does not have to be read by the eye or recorded by a scribble. There is no chance for even the smallest fraction to be missed . . . for the wrong weight to be set down through forgetfulness . . . or for hurried figures to be misread. Automatically, the weight to a fraction is printed in easily read figures on a ticket, or on a tape locked away in a tamper-proof case.

The Printomatic Weigher is supplied as standard equipment on Fairbanks scales for a wide variety of services, or attached to your present Fairbanks scales. Get the whole story by writing for Bulletin ASB580. Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. And 40 principal cities—a service station at each house.

7092-SA40.49

FAIRBANKS MORSE

FAIRBANKS SCALES

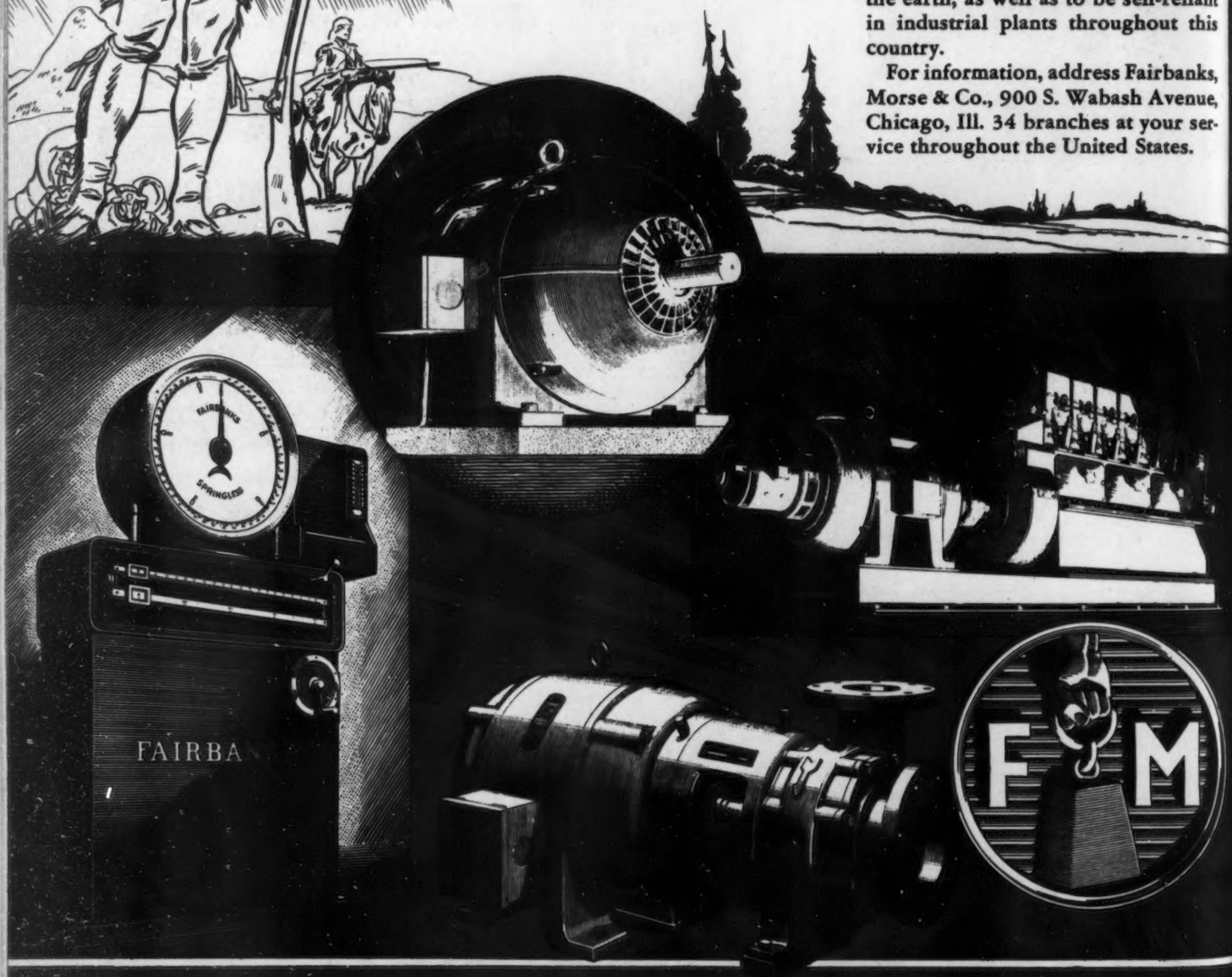
IN MAN OR MACHINE . . .

Pioneer Means Self-Reliant

● When the first product of the Fairbanks-Morse family was introduced, 107 years ago, there was only one engineering school in the English-speaking world, and only one other course in engineering offered.

Pushed out into a world where mechanical skill was a rarity, Fairbanks-Morse products had to have the same degree of self-reliance which characterized the early pioneers. Thus, the tradition of achieving dependability through simple design began with the first Fairbanks-Morse product. Inheriting this self-reliance, modern Fairbanks-Morse Diesels, pumps, and motors and Fairbanks scales continue to pioneer in the dark corners of the earth, as well as to be self-reliant in industrial plants throughout this country.

For information, address Fairbanks, Morse & Co., 900 S. Wabash Avenue, Chicago, Ill. 34 branches at your service throughout the United States.



FAIRBANKS - MORSE

Power, Pumping and Weighing Equipment

ANOTHER PLACE WHERE *Silent Gears mean Saving*

THERE are several economical aspects to the use of Bakelite Laminated *silent* gears and pinions in commercial laundry machinery. Unaffected by humid atmosphere, soapsuds, oil and fumes, these gears require a minimum of replacements.

In gear trains, Bakelite Laminated pinions substantially reduce wear on costly metal gears by eliminating metal-to-metal contact. In addition, their "cushioning" effect on meshing teeth cuts down the usual clash and clatter of geared machinery... it silences nerve-wracking noise that tends to decrease worker-output.

The same important benefits of Bakelite Laminated gears and pinions are obtained in hundreds of different types of machinery, today ...from light, high-speed equipment to heavy-duty mills and presses.

Write for our 52-page illustrated booklet 2L, "Bakelite Laminated" containing facts and figures that may suggest advantageous uses in your gearing.

BAKELITE CORPORATION, 247 PARK AVENUE, NEW YORK, N.Y.

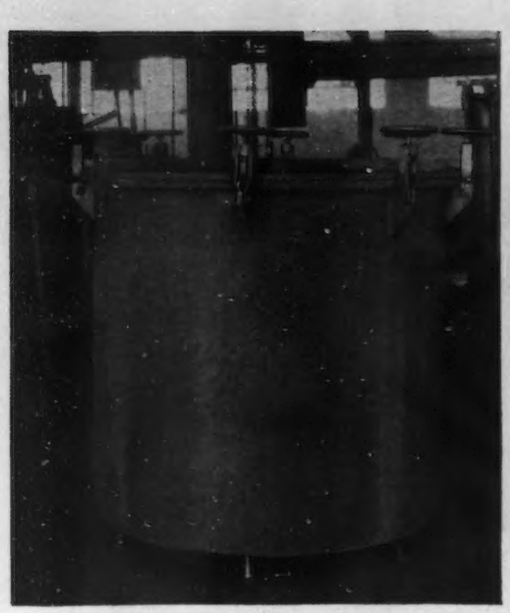
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Canada *West Coast:* Electrical Specialty Co., Inc., 316 Eleventh Street, San Francisco, Cal.

BAKELITE

REGISTERED U. S. PAT. OFF.

"The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the symbol "B" in the numerical sign for infinity, or unlimited quantity, it symbolizes the infinite number of present and future uses of Bakelite Corporation's products"

LAMINATED GEARS · PINIONS · PULLEYS · CASTERS



Yarn Dyer. Fabricated of IngAclad 18-8 Stainless-Clad Steel plate for New England textile mill, by James Russell Boiler Works, Boston, Mass.

"STAINLESS EQUIPMENT"

NOW AVAILABLE within most budgets

When you bid on new equipment or the repairing of old, quote on IngAclad. This remarkable achievement in steel, produced by the Ingersoll Steel & Disc Division of Borg-Warner Corporation, now makes it possible to offer stainless service at much lower cost.

For the Food, Chemical and other process industries, especially, IngAclad offers the benefits of finest stainless with an economy which makes its use an attractive investment.

Progressive Fabricators are finding IngAclad a splendid promoter of sales. If you have not investigated the possibilities it offers in the production of equipment for manufacturing, transporting and storing corroding products, write today for special IngAclad folder. Ask also for illustrated "Manual of Welding Procedures."

A PARTIAL LIST OF INGACLAD USERS

Includes:

Armour & Co.
C. O. Bartlett & Snow Co.
Campbell Soup Co.
Coppes, Inc.
Corn Products Refining Co.
Dow Chemical Co.
E. I. Du Pont de Nemours Co.
General American Tank Car Corp.
General Electric Co.
Hobart Mfg. Co.
Jeffrey Mfg. Co.
Kraft-Phenix Cheese Co.
S. S. Kresge Co.
Lever Bros.
Libby, McNeill & Libby
Link-Belt Co.
Otis Elevator Co.
Postum Cereal Co.
Procter & Gamble Co.
Standard Brands Inc.
Stevens Metal Products Co.
Southern Bleachery & Print Works
Swift & Co.

Stainless on the side that is used. Bonded to Steel Backing.

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 SOUTH MICHIGAN AVENUE · · CHICAGO, ILLINOIS

Specialists in High Carbon, Alloy and High Speed Steel and Stainless-Clad Sheets and Plates
Plants: CHICAGO, ILLINOIS, *and* NEW CASTLE, INDIANA

Trade Mark Reg. INGACLAD
STAINLESS-CLAD STEEL

"A BORG-WARNER PRODUCT"...

GIVES STAINLESS PROTECTION AT LOWER COST

REPRESENTATIVES:

H. Boker & Co. Inc., 101-103 Duane St., New York, N. Y.
Equitable Equipment Co., 410 Camp St., New Orleans, La.
Clark P. Schumacher, 240 S. Boyle Ave., St. Louis, Mo.
R. E. Chase & Co., Tacoma Bldg., Tacoma, Wash.
J. R. Kindig, Red Rock Bldg., Atlanta, Ga.
The Cameron & Barkley Co., Tampa, Fla.

WHICH STEAM HOSE WOULD YOU BUY?

Competitive Hose **BURST** after 26 hours flex-pressure test

Goodyear HD Asbestos **NO FAILURE** after 300 hours flex-pressure test

STEAM BREAK-DOWN FLEX TEST—steam hose mounted in this vibrating rack is subjected to 200 pounds saturated steam pressure. The lower frame is shuttled back and forth by a cam, creating flection as severe as any encountered in hardest service.

HERE is photographic evidence of the great superiority of Goodyear Style H. D. Asbestos Steam Hose in continuous high pressure steaming service required.

Tested side by side on the steam break-down flex machine shown at the right under 200 pounds saturated steam pressure the standard competitive hose burst after 26 hours flexing.

The Goodyear H. D. Asbestos showed no sign of failure at 300 hours and gave nearly 14 times longer service!

Cannot burst instantaneously

The longer life of this exclusive Goodyear hose is due to its specially compounded rubber tube that is capable of withstanding the action of 200 pounds of steam for over 8,000 hours—and to its heavy braided asbestos cord carcass that does not char with heat, making instantaneous bursts impossible.

It will pay you to consult the G.T.M.—Goodyear Technical Man—on Style H. D. for heavy duty steaming and Style M, Style 3330 and Style W designed for lighter service. To bring him, write Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.

BELTS
MOLDED GOODS
HOSE
PACKING
Made by the makers of Goodyear Tires

THE GREATEST NAME IN RUBBER

GOODYEAR

New...COMPLETE LINE

FRACTIONAL H. P. MOTORS

INCLUDING *NEW* FEATURES THE TRADE ASKED FOR

Single Phase • Polyphase • Direct Current

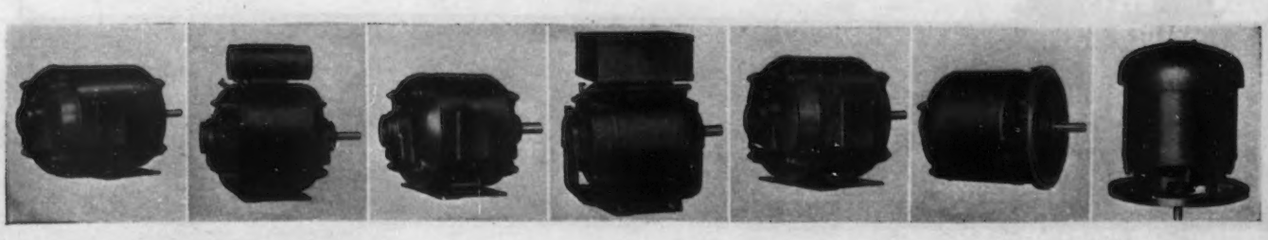
INDUSTRIAL • COMMERCIAL • DOMESTIC

Bulletin 1039 • Characteristics *and* Applications

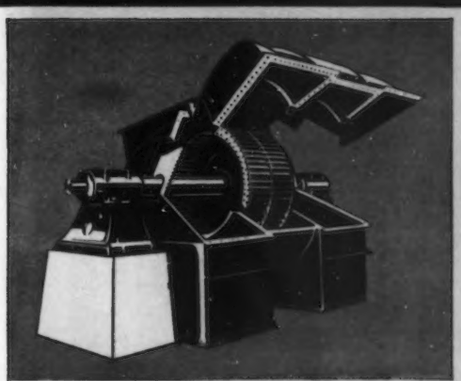
CENTURY ELECTRIC COMPANY

1806 Pine Street • • • St. Louis, Missouri

Offices and Stock Points in All Principal Cities



3 STEPS *to better* POWER PLANT PERFORMANCE



The American Blower Sirocco Induced Draft Fan

The Hydraulic Coupling for Variable Speed Fan control

The American Blower Dust Collector for minimizing the fly ash nuisance and reducing fan erosion

● The power plant engineer who is confronted with the problem of modernizing or expanding his facilities will do well to investigate these 3 steps:

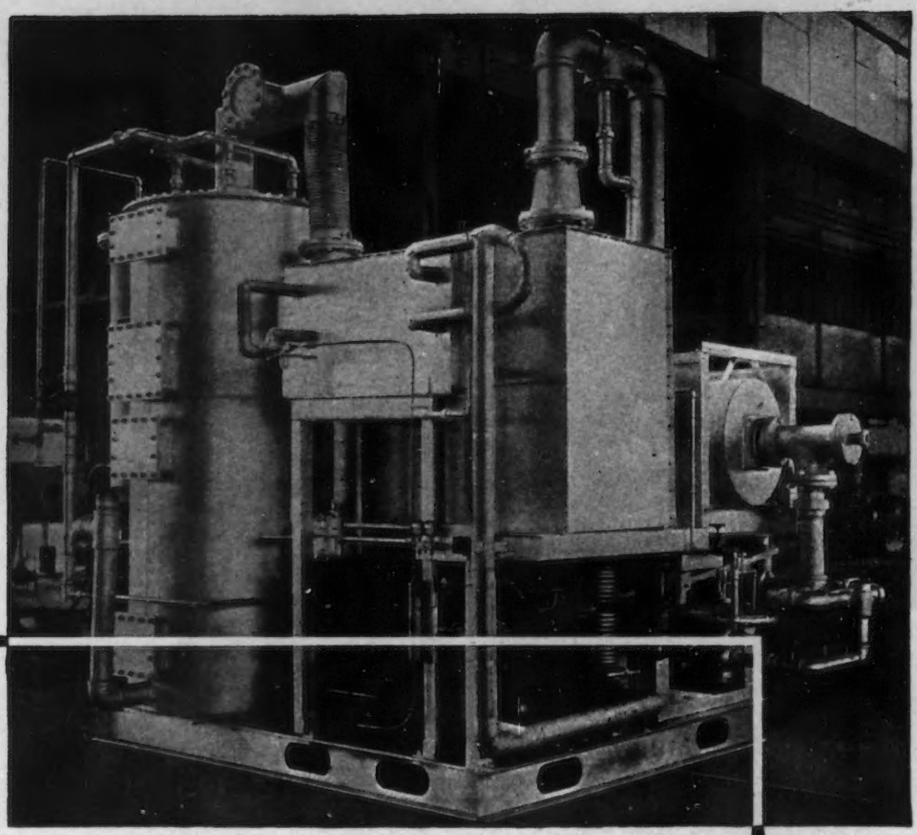
1. The application of Sirocco Induced Draft Fans.
2. Hydraulic Couplings for Variable Speed Fan control.
3. The installation of American Blower Dust Collectors for minimizing the fly ash nuisance and reducing fan erosion.

It is a significant fact that power plant engineers and executives today are buying more American Blower equipment than at any other previous time in our history. Phone or write the nearest American Blower branch office for data. There is no obligation.

AMERICAN BLOWER CORP.

Division of American Radiator and Standard Sanitary Corp.

6000 Russell Street, Detroit, Mich. • Canadian Sirocco Co. Ltd., Windsor, Ont.



GAS

Makes Controlled Furnace-Atmospheres Practical and Economical . . .

The possibility of improving the quality of products and reducing production costs by using controlled furnace atmospheres has long been recognized by engineers. Its use is now extended to a wide variety of industries.

With Gas, such controlled atmospheres are easily possible, on a practical and economical basis, and once again, gas has proved its right to be known as The Modern Industrial Fuel.

Machines now make atmospheres (from natural or manufactured gas) for a wide variety of heat treating operations and deliver them under accurate control to the work being treated. And gas fuel heats the work exposed to these atmospheres—heats it uniformly and makes a better quality work than ever before. These results are helping hundreds of manufacturers to improve their products, reduce over-all costs and increase their profits.

You, too, will want to enjoy all these new advantages of modern gas utilization. Call your gas company industrial engineer for complete information about how gas can help make profits in your plant. Call today—no obligation, of course.

AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION: 420 LEXINGTON AVENUE, NEW YORK CITY

"Industry is mind using Nature to make human life more free"

—HENRY FORD

OVERHEAD AT THE ROUGE

To thousands of visitors at the Ford plant in Dearborn, the 132 miles of overhead conveyor system is a matter for comment and question—a symbol of Ford production technique.

Even the casual observer sees that the back-break and strain of old-time industrial work have been transferred from tiring muscle to tireless metal. Application of the conveyor system has been carried a long way in Ford plants. It is one of many labor-serving devices developed there. Each of them multiplies the men's usefulness many times—and multiplies, too, the demand for the product they make.

It is reasonable to think of the whole Ford plant—with 7,250,000 square feet of floor space—as one gigantic conveyor system. Iron ore becomes finished product moving uninterruptedly from ore boat to blast furnace, foundry, open hearth, rolling mill and on into automobiles.

In ordinary metal handling, costs mount as iron or steel are reheated after they have cooled. At the Ford Rouge plant, metal handling is so swift and efficient that a minimum of heat is lost. From the time it runs out of blast furnaces, metal is kept hot, nursed and carried toward the next process without pause or delay.

It costs a lot to keep great stores of parts and materials on hand. So Ford keeps them at the smallest practical level. Raw materials arrive as needed. Production of parts and cars follows current needs closely. Ford plants are manufacturing—not storage—plants.

From Dearborn, parts and assemblies go to Ford branch plants without delay. Their journey is charted to the hour and the minute. They are billed to arrive not just "next week," but "Tuesday morning at 8:53," no later. At the branches, the conveyor system carries on. Time and money still are conserved.

Reasonably enough, at the receiving end of this great Ford conveyor system is the Ford V-8 owner. To him go the benefits of production skill and economy—the quality car in the low-price field.

FORD MOTOR COMPANY

Purchasers of

Harrisburg Seamless and Drop Forged Steel Products

Enjoy the Advantages of

Custom Made Steel

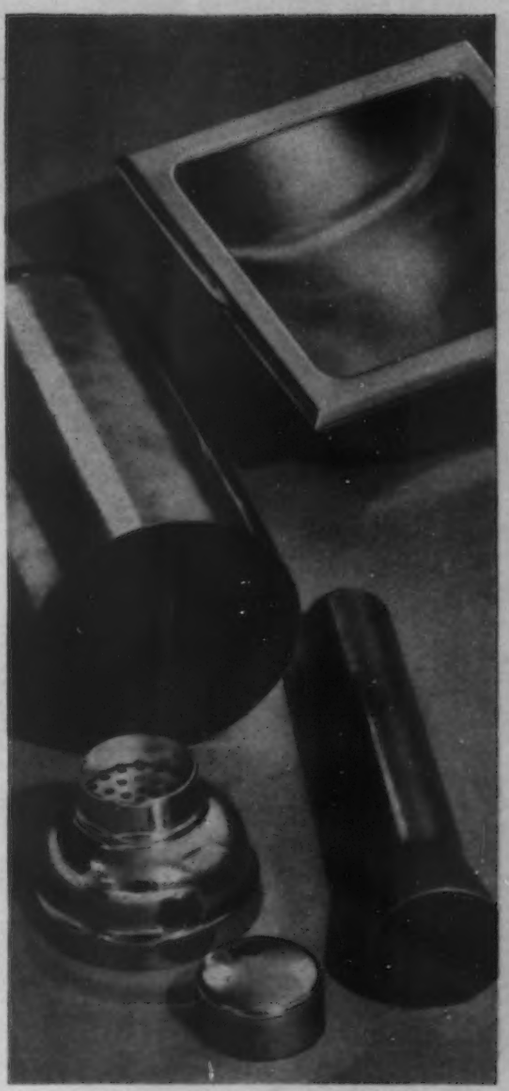
From the open hearth department to the last finishing operation, Harrisburg steel products are completely Harrisburg made. This is particularly important to purchasers of high duty items. It means something to know that at every step in the production of, for instance, a high pressure gas cylinder, responsibility is fixed upon a metallurgist, a mechanical engineer, forge and machine shop foremen who each have specialized experience in seamless steel manufacture; that they are constantly collaborating to meet your particular metal and processing specifications. That's why you can depend on Harrisburg for the highest technical excellence when ordering these seamless and forged steel products: alloy and carbon steels; drop and hollow forgings; pipe couplings and flanges; pump liners; seamless gas cylinders; bull plugs; coils and bends. : : Harrisburg, Pennsylvania

HARRISBURG STEEL CORPORATION

"Gerwhock, gerwhock, sppsss!"

. . . and out came a gallon can

Recently a newspaper columnist* picturesquely described a drawing operation as follows: "A man slides a sheet of metal into a machine; a big plunger comes down; the machine goes 'gerwhock, gerwhock, sppssss!' the plunger goes back up, and there you have a gallon can." Perfectly simple...if the machine, the dies and the metal are okay. Especially the metal. In this type of work, many apparently small differences in material or practice may seriously affect costs. Here is an instance:



Revere Technical Advisory Service Saves Manufacturer $6800 per 100,000 Units

Revere Technical Advisory Service was called in to help a certain manufacturer who was having trouble in drawing sheet brass. Investigating, the Revere Technical Adviser also found that trouble was being experienced in a "fold-up" operation. As an initial step he had the Revere research laboratories analyze and test samples of the metals used. After studying the analysis and test reports, he suggested several other brass mixtures for trial, recommending that the manufacturer standardize on the metal found best for uniformly good results. Observing, too, that the manufacturer was buying sheet brass in random lengths, the Revere Technical Adviser showed that a change in dies to permit a reduction in width would allow a substantial saving in scrap and enable the manufacturer to purchase the metal in conveniently handled coils. These changes resulted in savings ranging up to $6800 per hundred thousand units of production.

This service cost the manufacturer nothing, but saved him many thousands of dollars annually. You, too, if you have a problem involving possible use of copper or its alloys, may have the service of a Revere Technical Adviser without charge and with no obligation. Please address our Executive Offices, 230 Park Avenue, New York City.

*New York World-Telegram

Revere Copper *and* Brass

INCORPORATED

FOUNDED BY PAUL REVERE 1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS. NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

A Robert Yarnall Richie photograph

METALS

and how to convert them into finished products.

To provide information on the latest developments in materials, processes and metal working equipment is the purpose of the National Metal Show.

This is also the theme and purpose of The Iron Age National Metal Issue to be published October 14.

The India tint insert in this issue will carry the following sections:

- ★ *Metal Treating, Furnaces and Refractories*
- ★ *Welding and Cutting*
- ★ *Metals*
- ★ *Metal Cleaning and Finishing*
- ★ *Metal Working Machinery and Tools*
- ★ *Testing and Inspection*

Each section will be introduced with an attractive pictorial spread followed by original, authoritative editorial articles dealing with these subjects.

Advertising will be placed right in the sections either following the editorial articles at regular space rates, or facing one of the editorial pages at slight additional cost.

Here is an issue which you may be sure will be read and studied by executives in metal working plants. It is an unusual publicity opportunity.

Pick the section in which you want your advertisement placed and send in your space reservation, or write for further details.

The National Metal Congress and Exposition
Atlantic City Auditorium
October 18-22, 1937

●

Under the auspices of:
American Society for Metals

Also co-operating:
American Welding Society
Iron & Steel Division, A.I.M.E.
Institute of Metals Division, A.I.M.E.
Iron & Steel Division, A.S.M.E.
Machine Shop Practice Division, A.S.M.E.
Wire Association

THE IRON AGE
National Metal
Insert • October 14, 1937

For NERVOUS MACHINES

Rx

UNSHAKO

The Nut That Can't Shake Loose

Vibration is licked when it meets "Unshako" . . . the ingenious self-locking ring, built right in the nut, holds it tight against the severest shaking and jarring, yet with an ordinary wrench it backs off without a murmur.

There are no separate washers, pins or parts to bother with.

This nut, though new in principle, has successfully proven every claim in almost every type of industry where vibration has been at its worst.

Write for complete information.

Pat'd. and Pat's. Pending

Fig. 1510

Cutout section showing Locking Ring in place.

STANDARD PRESSED STEEL CO.

BRANCHES BOSTON DETROIT INDIANAPOLIS

JENKINTOWN, PENNA.

Box 523

BRANCHES CHICAGO ST. LOUIS SAN FRANCISCO

that Keep a man busy with a wrench

Modern Hydraulic Presses

For more than 30 years we have been supplying

Hydraulic Forging Presses

with a capacity up to 20,000 Tons, Flanging and Bending Presses, Frame Presses, Riveting Machines, Hydraulic Presses for the manufacture of steel tubes, Ingot Breakers, Shears, Mandrel Staving Presses, Tube Upsetting and Testing Presses, Punching and Drawing Presses, Hydraulic Tube and Rod Extrusion Presses of horizontal or vertical type.

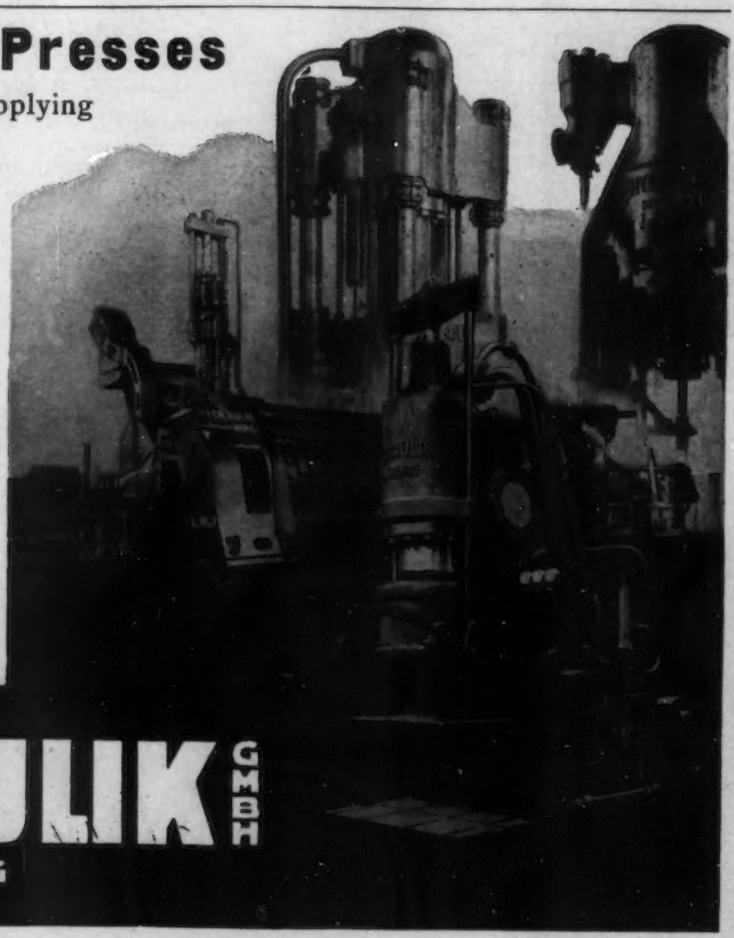
We construct complete Press Works, with all auxiliary devices: Pressure Pumps, Controls, Pipe Lines and Compressed Air Accumulators built without piston or float.

When visiting the Düsseldorf Exhibition "Schaffendes Volk" open from May until October, 1937, do not fail to look up the stand of HYDRAULIC G.m.b. H. in the exhibition room No. 15 reserved for Machine Tools.

Please apply to

SEAMLESS STEEL EQUIPMENT CORPORATION

39 Broadway, New York, N. Y.



HYDRAULIK GMBH

DUISBURG

For material handling power and speed . . . . RELY ON EXIDE-IRONCLAD

The Atlas Car and Mfg. Co.

THE electric industrial trucks of today are built for outstanding performance. All they need is a motive power battery that will bring out the best that's in them. And that is why you'll find so many important plants depending on Exide-Ironclad.

These batteries are built for the tough jobs. They put extra speed and endurance into your material handling service. When needed, they can pour out almost unlimited power. They keep materials moving as fast toward the end of a shift as at the beginning. They demand almost no attention, and they stay out of trouble on the job. Their demonstrated ability to deliver such service for years means a definite saving on every load of materials moved.

Why not let Exide-Ironclad Batteries speed up your material handling service and cut costs? Write for new, free booklet, "Battery Handling Systems and Equipment."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Crescent Truck Company

Easton Car and Construction Co.

Wright-Hibbard Industrial Electric Truck Co., Inc.

CROSBY *for* STAMPINGS

Serving Industry Since 1896

ALL our efforts have been concentrated on one product — STAMPINGS—for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.

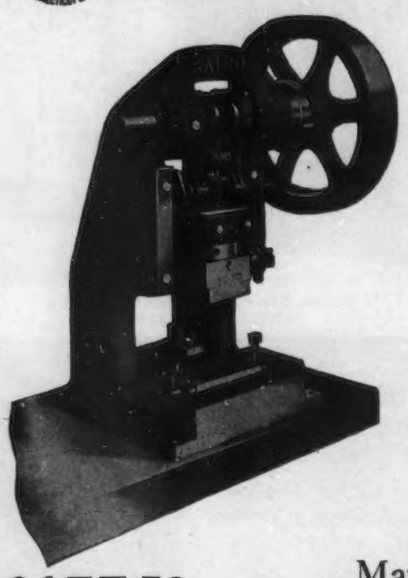
Get Acquainted With Crosby Service

THE CROSBY COMPANY

General Offices and Works: BUFFALO, NEW YORK

Branch Offices: Chicago Detroit Cleveland New York Philadelphia

BARGAIN



No. 1 BAIRD Double Action Open Back Bench Power Presses

Approximate Specifications

Height from Bed to Center of Shaft	16¾"
Stroke of Slide	¾"
Diameter of Shaft in Bearings	3"
Diameter of Shaft Crank Pin	1⅞" & 1⅝"
Stroke Diameter of Drawing Plunger	1½"
Diameter of Drawing Plunger	1 5/16"
Maximum Depth shell can be transferred	½"
Maximum Diameter Blank to cut and draw	1½"
Adjustment of Slide	½"
Height, Bed to Slide (Slide down, Adjustment up)	6"
Height, Bed to Ways	6"
Width between Uprights	7½"
Center of Slide, Back to Uprights	3⅛"
Center of Slide to Front of Bed	3½"
Bed, Front to Back	6½"
Bed, Side to Side	13⅛"
Die Bed Holes ½" tap No. 1, ⅝" tap No. 2	7½" c. to c.
Diameter of Opening in Bed	2⅛"
Diameter and Face of Balance Wheel	14" x 2¾"
Weight of Balance Wheel	50 lbs.
R. P. M. of Balance Wheel	150
Height, Floor to Top of Bed	32"
Weight	250 lbs.

$157.50

May be had with Iron Table 18" x 24"—$22.00 extra.
While they last an overstock of these presses is available at the half price quoted.
May also be had with Automatic Feed Attachments at extra cost.

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.

BUNDY TUBING

Contributes Safety

Wherever great strength and resistance to vibration are important factors, Bundy Tubing finds a place. Its stamina and dependability have been proven in many bursting and vibration tests and in actual use in today's motor cars, refrigerators, and other mechanisms. • Bundy Tubing is available in a wide range of sizes either in lengths or completely fabricated. Quotations will be gladly furnished from your blueprint or samples.

BUNDY TUBING CO.
DETROIT

Built as Sturdily as a Pyramid—

and just as

HARD TO PUSH OVER!

Pat'd and Pat's Pending Fig. 732

"HALLOWELL" STEEL WORK BENCHES

can't wobble or tip!

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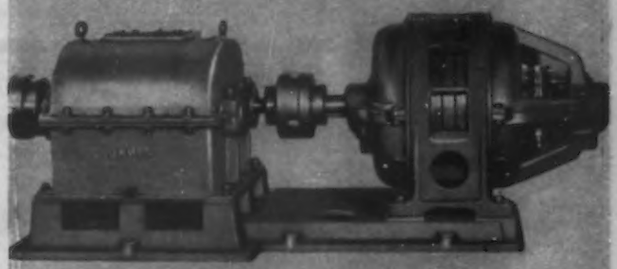

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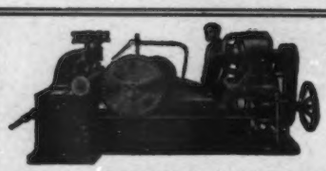

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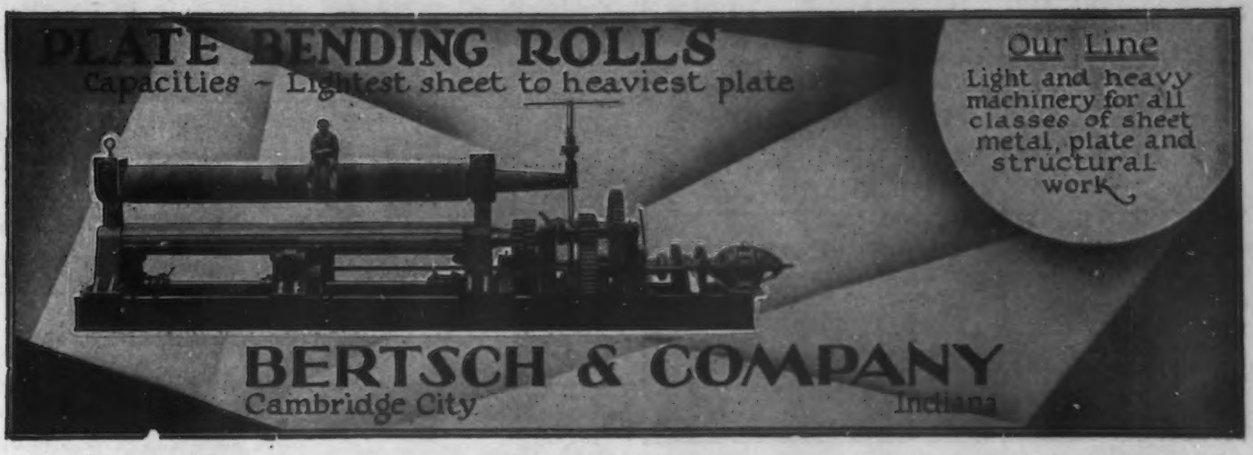
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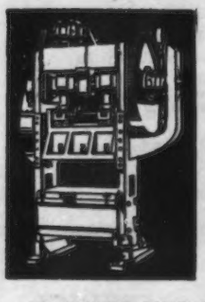

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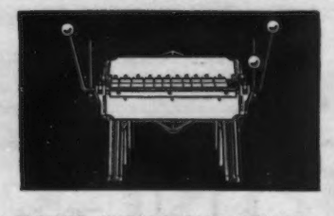

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Andrews Steel Co., The, Newport, Ky.

BILLETS—Forging
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Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Nickel Steel
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BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

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Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1605 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

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Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St.,N.Y.C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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American Blower Corp., 6000 Russell St., Detroit.
North American Mfg. Co., The, Cleveland.
Spencer Turbine Co., Hartford, Conn.

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Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N.J.
Torit Mfg. Co., St. Paul, Minn.
Weldit Acetylene Co., Detroit.

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Babcock & Wilcox Co., The, 85 Liberty St., New York City.

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Babcock & Wilcox Co., The, 85 Liberty St., New York City.

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Landis Mch. Co., Inc., Waynesboro, Pa.

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Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

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Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

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Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
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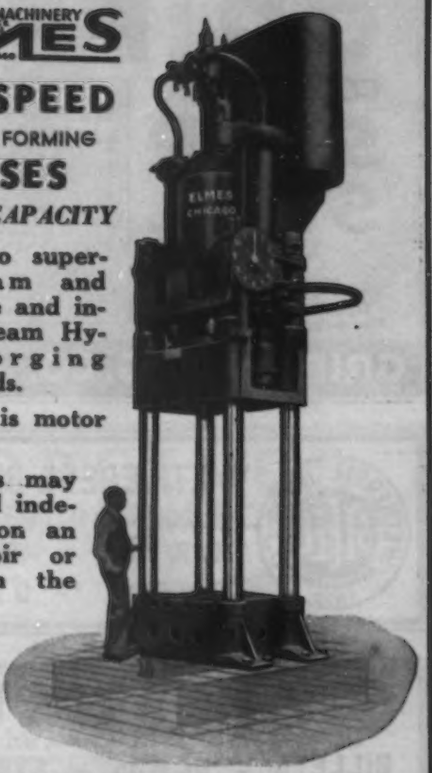

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Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

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BOLTS—Track
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Bartlett, C. O.-Snow Co., The, Cleveland.

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Hoskins Mfg. Co., Detroit, Mich.
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Meehanite Metal Corp., Pittsburgh.

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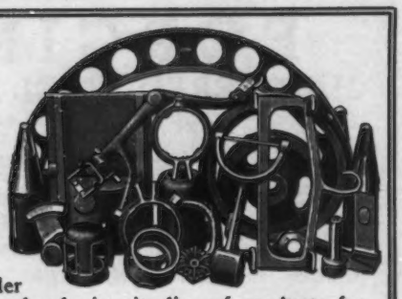

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COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Hobart Bros., Troy, Ohio.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION
Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N.Y.C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia, Pa.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Flexible Wire Belt
Audubon Wire Cloth Corp., Phila., Pa.

CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Air Hose
Cleveland (Ohio) Pneumatic Tool Co., The.

COUPLINGS—Cut-off Friction
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of the Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Union Drawn Steel Co., Massillon, Ohio.

CRANKSHAFTS—Forged
Bay City Forge Co., Erie, Pa.

CRUSHERS—Coal
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Jeffrey Mfg. Co., The, Columbus, Ohio.

CRUSHERS—Steel Turning
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

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CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives
Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Mch. Wks., Philadelphia.
Heller Machine Co., 114 Liberty St., N. Y. C.

CUTTING-OFF MACHINES—Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Etna Machine Co., The, Toledo, Ohio.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS — Compressed Air & Hydraulic
Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent
Detroit Rex Products Co., Detroit, Mich.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

DIE BLOCKS—Drop Hammer
Heppenstall Co., Pittsburgh.

DIE-FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SINKING MACHINES — Automatic and Hand
Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel
Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Bliss, E. W., Co., Toledo, Ohio.
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof
Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL HEADS—Hydraulic
National Automatic Tool Co., Richmond, Ind.

DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford, Conn.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Rock
Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleereman Machine Tool Co., Green Bay, Wis.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleereman Machine Tool Co., Green Bay, Wis.

DRIVES—Gear
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS
Abrasive Machine Tool Co., East Providence, R. I.
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 401 Bykrit St., Mishawaka, Ind.
Blaw-Knox Co., Pittsburgh.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

ECONOMIZERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING
General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING — See Welding — Electric

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY — Second Hand. (See Clearing House Section)

ELECTRICAL WIRES
Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODE HOLDERS—Welding
Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding
Electrolcy Co., Inc., 50 Church St., New York City.

ELECTRODES—Welding, Coated
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES
Udylite Co., The, Detroit.

ELEVATORS—Portable
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

ELEVATORS—Steam Hydraulic
Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMEL
Sherwin-Williams Co., Cleveland.

ENGINEERS & CONTRACTORS
Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial
Koppers Co., Pittsburgh.

ENGINES—Diesel
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Gas
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

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ENGINES—Oil
Ingersoll-Rand Co., 11 Broadway, New York City.
Worthington Pump & Machinery Corp., Harrison, N. J.

EYELET MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

FACING CLAY
Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES
Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Cooling
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS—Ventilating
American Blower Corp., 6000 Russell St., Detroit.
DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURIFIERS
Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

FELT—Wool Mechanical
American Felt Co., 315 Fourth Ave., N.Y.C.

FENCING—Wire
Pittsburgh (Pa.) Steel Co.

FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

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Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSPIEGELEISEN
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

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Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E 42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FILES & RASPS
Disston, Henry, & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

FILTER CLOTH—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

FILTERS—Air
American Air Filter Co., Inc., Louisville, Ky.

FILTERS—OIL
National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh.

FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.

FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.

FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Co., Burnham, Pa.

FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT
Lovejoy Flexible Coupling Co., Chicago.
Strand, N. A., & Co., Chicago.

FLOODLIGHTS—Acetylene
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING
Acme Steel Co., Chicago, Ill.

FLOOR (CONCRETE) REPAIR MATERIALS
Flexrock Co., 892 N. Delaware Ave., Phila., Pa.

FLOOR PLATES—See Plates—Floor or Cellar Door

FLOORING—Acid Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Monolithic
Johns-Manville Corp., 22 East 40th St., New York City.

FLOORING—Open Steel
Blaw-Knox Co., Pittsburgh.
Hendrick Mfg. Co., Carbondale, Pa.

FLOORING—Steel
American Pressed Steel Co., Phila., Pa.

FLUX—Welding
Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.

FORGING MACHINES—Roll
Ajax Mfg. Co., The, Euclid, Ohio.

FORGING MACHINES—Upset
Ajax Mfg. Co., The, Euclid, Ohio.

FORGINGS—Alloy Steel
Heppenstall Co., Pittsburgh.

FORGINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Poor & Co., Canton Forge & Axle Wks., Canton, Ohio
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Williams, J. H., & Co., Buffalo, N. Y.

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.

FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Rockford (Ill.) Drop Forge Co.

FORMING MACHINES—Roll
Kane & Roach, Inc., Syracuse, New York.

FOUNDRY EQUIPMENT & SUPPLIES
Jeffrey Mfg. Co., The, Columbus, Ohio.
Whiting Corp., Harvey, Ill.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Leeds & Northrup Co., Philadelphia.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

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FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S., Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia, Pa.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GALVANIZING
Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

GASKETS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CHECKING EQUIPMENT
Michigan Tool Co., Detroit.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Brown & Sharpe Mfg. Co., Prov., R. I.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
James, D. O., Mfg. Co., Chicago.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEAR SHAVING MACHINES
Michigan Tool Co., Detroit.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GENERATORS—Electric, Second Hand. (See Clearing House Section)

GOGGLES—Safety
American Optical Co., Southbridge, Mass.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRABS—For Sheets and Coils
J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

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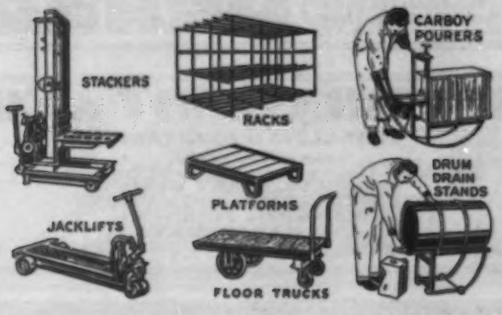

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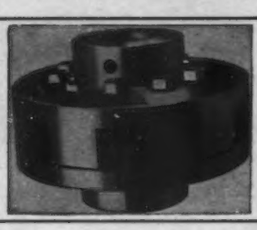

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Excelsior Tool & Mch. Co., E. St. Louis, Ill.
Norton Co., Worcester, Mass.
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

GRINDING MACHINES—Centerless
Cincinnati (Ohio) Grinders Incorporated.

GRINDING MACHINES—Chucking
Bryant Chucking Grinder Co., Springfield, Vt.

GRINDING MACHINES—Cutter & Reamer
Cincinnati (Ohio) Milling Mch. Co., The.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.
Hutto Machine Division, Carborundum Co., Detroit.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GRINDING MACHINES—Internal
Bryant Chucking Grinder Co., Springfield, Vt.
Greenfield (Mass.) Tap & Die Corp.
Heald Mch. Co., Worcester, Mass.
Hutto Machine Division, Carborundum Co., Detroit.

GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

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GRINDING MACHINES—Portable Electric
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GRINDING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.
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GRINDING MACHINES—Roll
Cincinnati (Ohio) Grinders Incorporated.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
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GRINDING MACHINES—Saw
Heller Machine Co., 114 Liberty St., N. Y. C.

GRINDING MACHINES—Snagging
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Blanchard Machine Co., The, Cambridge, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
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Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GRINDING MACHINES—Swing Frame
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

GRINDING MACHINES—Tap
Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Tool
Cincinnati (Ohio) Milling Mch. Co., The.
Gisholt Machine Co., Madison, Wis.
Landis Tool Co., Waynesboro, Pa.
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Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N.Y.
Macklin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Norton Co., Worcester, Mass.

GRINDING WHEELS—Segment
Blanchard Machine Co., The, Cambridge, Mass.

GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Peerless Mch. Co., Racine, Wis.

HAMMER BOARDS
Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

HAMMERS—Air, Forging
Nazel Engineering & Machine Works, Philadelphia.

HAMMERS—Chipping & Riveting—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Drop
Bliss, E. W., Co., Toledo, Ohio.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., Providence, R. I.

HAMMERS—Helve
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Portable Electric
Wodack Electric Tool Corp., Chicago.

HAMMERS—Power
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

HANGERS—Ball Bearing
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

HEADING MACHINES
Ajax Mfg. Co., The, Euclid, Ohio.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

HEADS—Spun and Pressed
Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.

HEADS—Steel—Flanged & Dished
Central Iron & Steel Co., Harrisburg, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Holden, A. F., Co., New Haven, Conn.
Parish Pressed Steel Co., Reading, Pa.

HEAT TREATING COMPOUNDS
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING EQUIPMENT — Air Draw
Holden, A. F., Co., New Haven, Conn.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

HEATING RESISTANCE — Non-Metallic
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HOISTS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Northern Engineering Works, Detroit.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric
American Engineering Co., Philadelphia.
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

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Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS—Scraper
Sullivan Machinery Co., Claremont, N. H.

HONING MACHINES
Micromatic Hone Co., Detroit.

HOSE—Flexible Metallic
American Brass Co., The, Waterbury, Conn.

HOSE—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Hydraulik Gmbh. Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co., The.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LACQUER
Sherwin-Williams Co., Cleveland.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
Baird Mch. Co., The, Brideport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
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Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD—In Oil
Sherwin-Williams Co., Cleveland.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gasoline
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
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Jeffrey Mfg. Co., The, Columbus, Ohio.
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

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Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

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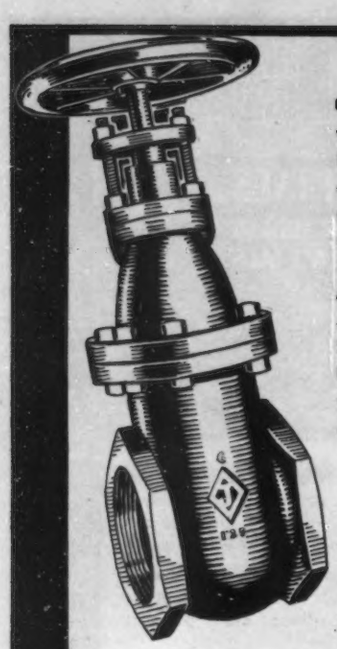

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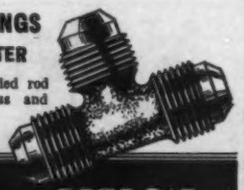

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PRESSES—Coining
Bliss, E. W., Co., Toledo, Ohio.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

PRESSES—Forging
Ajax Mfg. Co., The, Euclid, Ohio.
Hydraulik Gmbh, Duisburg, Germany.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Bliss, E. W., Co., Toledo, Ohio.
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Trimming
Bliss, E. W., Co., Toledo, Ohio.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

PULVERIZERS
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Whiting Corp., Harvey, Ill.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rumsey Pump Corp., Seneca Falls, N. Y.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Rumsey Pump Corp., Seneca Falls, N. Y.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Niagara Machine & Tools Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Mach. Mfg. Co., Pittsburgh.

PYROMETERS—Indicating
Brown Instrument Co., The, Philadelphia, Pa.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.
Iron & Steel Products, Inc., Chicago.
Sherwood, E. C., 50 Church St., N. Y. C.

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.
Iron & Steel Products, Inc., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

REAMING MACHINES
Blanchard Machine Co., The, Cambridge, Mass.

RECORDERS—Furnace Atmosphere
Brown Instrument Co., The, Philadelphia, Pa.

REELS—For Coil Stock
Littell, F. J., Mch. Co., Chicago.

REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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RIDDLES—Foundry
Ludlow-Saylor Wire Co., St. Louis, Mo.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Hannifin Mfg. Co., Chicago.
Shuster, F. B., Co., The, New Haven, Ct.

RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Clark Bros. Bolt Co., Milldale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Una Welding, Inc., Cleveland, Ohio.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Bliss, E. W., Co., Toledo, Ohio.
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bliss, E. W., Co., Toledo, Ohio.
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Kane & Roach, Inc., Syracuse, New York.
Lake Erie Engineering Corp., 68 Kenmore Sts., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Johns-Manville Corp., 22 East 40th St., New York City.
Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ROOFING MATERIALS
Carey, Philip, Co., The, Cincinnati.

RUBBER LININGS
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

RUST REMOVING
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.
Heller Machine Co., 114 Liberty St., N. Y. C.
Peerless Mch. Co., Racine, Wis.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapo'
Disston, Henry, & Sons, Inc., Ph'

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

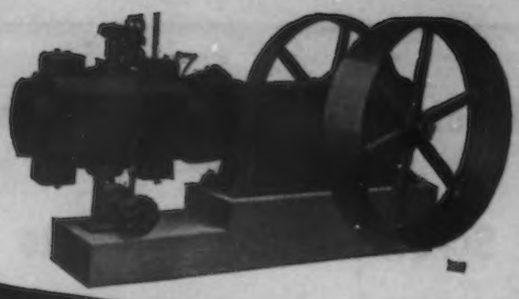
SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SCALES
Exact Weight Scale Co., Columbus, Ohio.
Fairbanks, Morse & Co., Chicago.

SCREENS—Manganese Steel
Manganese Steel Forge Co., Phila., Pa.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.



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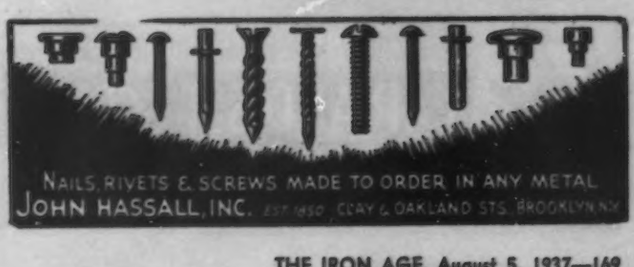
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Products Index

Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Ludlow-Saylor Wire Co., St. Louis, Mo.
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven.
Houde Engineering Corp., Buffalo, N. Y.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Peck Spring Co., The, Plainville, Conn.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The, Cleveland.
National Acme Co., The, Cleveland
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Coach or Lag
Lamson & Sessions Co., The, Cleveland.

SCREWS—Machine
Blake & Johnson Co., The, Waterville, Ct.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS, Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N.Y.

SECOND - HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milkauwee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

SHAFTING—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Forged
Bay City Forge Co., Erie, Pa.

SHAFTING—Steel
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
American Spring & Mfg. Corp., Holly, Mich.
Cuyahoga Spring Co., The, Cleveland.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A. Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Heppenstall Co., Pittsburgh.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES—Billet
Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Continuous Sheet & Pack
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

SHEARING MACHINES—Plate
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Bliss, E. W., Co., Toledo, Ohio.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Kane & Roach, Inc., Syracuse, New York.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

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SHEETS—Copper Alloy
American Brass Co., The Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Enameling
American Rolling Mill Co., Middletown, O
Carnegie-Illinois Steel Corp. (U. S. Stee Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp Subsidiary), San Francisco, Calif.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St.,

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SHUTTERS—Steel & Wood Bi-Folding
Kinnear Mfg. Co., Columbus, Ohio.

SILICO—MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLABS
Andrews Steel Co., The, Newport, Ky.

SLINGS—Wire Rope
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engineering & Machine Works, Philadelphia.

SOLVENTS—Oil & Grease
Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Mach. Mfg. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, O.
National Rubber Machinery Co., Clifton Div., Clifton, N. J.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
Goodrich, B. F., Co., The, Akron, Ohio.

SPEED REDUCERS
Boston Gear Wks, Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd, Chicago.
Link-Belt Co., Chicago.
Philadelphia (Pa.) Gear Works.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Screw
Oliver Iron & Steel Corp., Pittsburgh.

SPIKES—Track
Ames, W., & Co., Jersey City, N. J.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAY FINISHING EQUIPMENT
DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Paint
DeVilbiss Co., The, Toledo, Ohio.

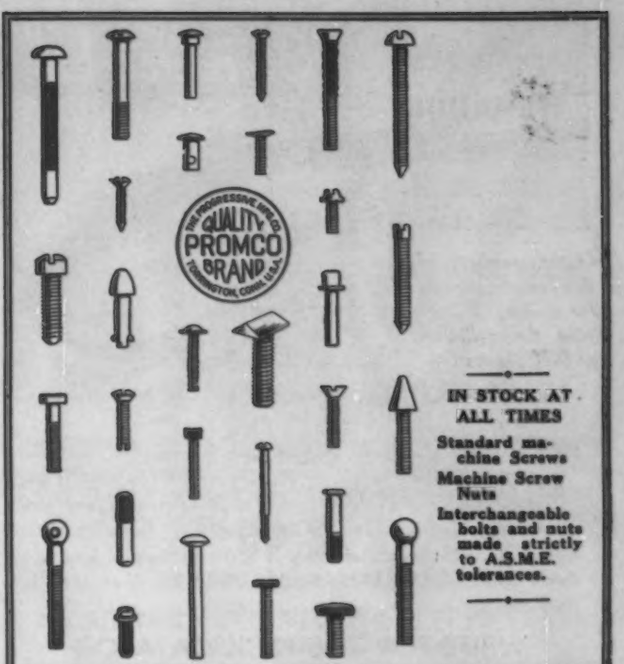
SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Car
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes-Gibson-Raymond, Detroit Plant. Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Peck Spring Co., The, Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Boerum, A. L., Co., 7115 Charles St., Phila., Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
E S M C O Auto Products Corp., Bush Terminal Bldg. 27, Bklyn., N. Y.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lansing (Mich.) Stamping Co., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
National Machine Tool Co., Racine, Wis.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Sessions, J. H., & Son, Bristol, Conn.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company
Truscon Steel Co., Pressed Steel Div., Cleveland.



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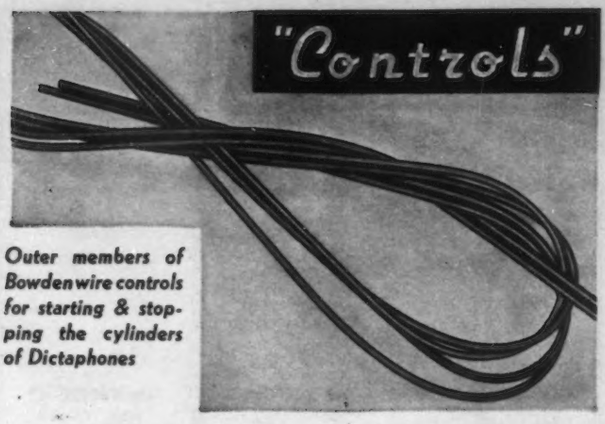

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BIRDSBORO, PENNA.

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Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures

Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

STAPLES—Wire

Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting

Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy

Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
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Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn

Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Bright Finished

Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon

Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium

Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome

Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese

Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel

Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver

Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium

Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt

Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn

Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips

Acme Steel Co., Chicago.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Athenia Steel Co., Clifton, N. J.
Bethlehem (Pa.) Steel Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Pgh.
Thomas Steel Co., The, Warren, Ohio.
Weirton (W. Va.) Steel Co.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electro Copper Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized

Acme Steel Co., Chicago, Ill.
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless

Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting

Midvale Co., The, Nicetown, Phila., Pa.

STEEL—Crucible

Jessop Steel Co., Washington, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery

Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die

Andrews Steel Co., The, Newport, Ky.
Disston, Henry, & Sons, Inc., Philadelphia.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill

Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric

Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed

Bethlehem (Pa.) Steel Company.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips

Acme Steel Co., Chicago.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn., Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Pgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated

Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized

Acme Steel Co., Chicago.

STEEL—Magnet

Latrobe (Pa.) Electric Steel Co.

STEEL—Nickel

Andrews Steel Co., The, Newport, Ky.

STEEL—Open Hearth

Andrews Steel Co., The, Newport, Ky.
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rolled Manganese

Manganese Steel Forge Co., Phila.

STEEL—Rustless

Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Screw

Bliss & Laughlin, Inc., Harvey, Ill.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis

Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Spring

Athenia Steel Co., Clifton, N. J.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Great Lakes Steel Corp., Detroit.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL-Stainless

Acme Steel Co., Chicago.
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Bethlehem (Pa.) Steel Company.

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Republic Steel Corp., Cleveland, Ohio.
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Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Steel Corp., Grant Bldg., Pittsburgh.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The Cleveland.
Darwin & Milner, Inc., Cleveland.
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Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
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Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos., T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., inc., Cambridge, Mass.
Windau Steel Co., Cleveland.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox, The, 85 Liberty St., New York City.
Whiting Corp., Harvey, Ill.

STOP WATCHES
Stillman, M. J., Co., Inc., Chicago.

STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Kane & Roach, Inc., Syracuse, New York.
Medart Co., The, St. Louis, Mo.

STRAIGHTENING MACHINES—Wire
Kane & Roach, Inc., Syracuse, New York.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Etna Machine Co., The, Toledo, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Cellcote Co., The Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Mnhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Petroleum Iron Works Co., The, Sharon, Pa.
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R., & Sons Mfg. Corp., Pittsburgh.
Petroleum Iron Works Co., The, Sharon, Pa.
Scaife, Wm. B., & Sons, Co., Ptgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.
Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
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Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Petroleum Iron Works Co., The, Sharon, Pa.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros. Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mcsh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIMING INSTRUMENTS
Stillman, M. J., Co., Inc., Chicago.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TONGS—Automatic
Heppenstall Co., Pittsburgh.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Michigan Tool Co., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

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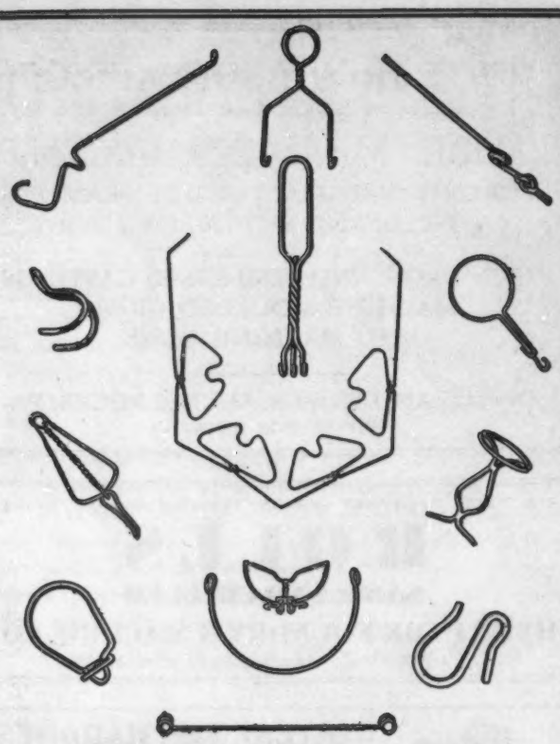

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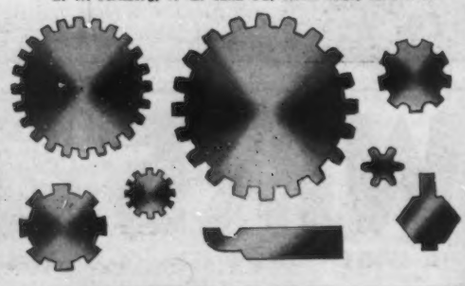

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TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

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Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.
Weldit Acetylene Co., Detroit.

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TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

TREADS—Safety
American Pressed Steel Co., Phila., Pa.
Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
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Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

TRUCKS—Dump (Industrial)
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TRUCKS—Elevating (Power)
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
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Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

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Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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Yale & Towne Mfg. Co., The, Phila., Div., Phila., Pa.

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Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., Ptgh.
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TUBES—Boiler
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Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
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TUBES—High Carbon
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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

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Ryerson, Jos., T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
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Ryerson, Jos. T., & Son, Inc., Chicago.
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Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
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Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
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TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

UNIT HEATERS—Electric
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting
Dietzel Lead Burning Co., Pittsburgh.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Brown Instrument Co., The, Philadelphia, Pa.
Galland-Henning Mfg. Co., Milwaukee.
Hannifin Mfg. Co., Chicago.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
North American Mfg. Co., The, Cleveland.
Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Seated) Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning
Brown Instrument Co., The, Philadelphia, Pa.
North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VARNISH—Acid Resisting
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VISES
Cincinnati (Ohio) Milling Mch. Co., The.
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WASHERS—Iron or Steel
Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Heis & Heiz, Inc., 33—34th St., Brooklyn, N. Y.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
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Beall Tool Co., East Alton, Ill.
Butcher & Harb Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
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Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh

WELDING CONTACTORS
Clark Controller Co., The, Cleveland.

WELDING CONTACTS—Resistance
Electroloy Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The., 30 East 42nd St., N. Y. C.
Milburn, Alexander Co., The, Baltimore, Md.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
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General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Hobart Bros., Troy, Ohio.
Lincoln Electric Co., The, Cleveland.
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WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

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Swift Electric Welder Co., Detroit.

WELDING MACHINES—Spot
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.
Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

WIRE—Mattress
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WIRE—Netting
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Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Rustless
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WIRE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.

WIRE—Water-proof Rubber Insulated
Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Manganese Steel Forge Co., Phila., Pa.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Audubon Wire Cloth Corp., Phila., Pa.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Michigan Wire Cloth Co., 2117 Howard St., Detroit, Mich.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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WIRE FORMING MACHINERY
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Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL MACHINERY AND EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

WIRE NAIL MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
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Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ZINC—Strip
Platt Bros. & Co., The, Waterbury, Conn.

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54", 60" Colburn
Drills—1, 2, 3, 4 spdl. Leland-Gifford
1, 2, 3, 4, 6 Spdl. Henry & Wright
32" Cinn.-Bickford Sltd. Hd.
No. 2 Colburn, 1, 2, 3, & 4 Spdl.
Nos. 121, 314, 513 Baker
No. 210—1 and 3 spdl. Barnes
No. D-5 Colburn
No. 2 Western Multiple
No. 14 Natco Multiple
No. 4 Baush Multiple
Radials—40" Cinn.-Bickford Plain
4' American Triple Purpose
4' American Plain
5' American full univ., M.D.
6' Western Triple Grd.
6' American Triple Purpose
6' Cinn.-Bickford full univ.
Gear Cutters, No. 18-H Gould & Eberhardt
No. 16 HS Gould & Eberhardt
11" Gleason Bevel Gear Planer
No. 4—48" Brown & Sharpe
No. 6—60" Brown & Sharpe
No. 6—72" Brown & Sharpe
Nos. 6, 61, 62, 65, 615, 625 Fellows
12"x72" G. & E. Rack Cutter
Grinders, Heim Centerless
10"x36", 52" Landis, plain
20"x168" Landis, plain M.D.
28"x96" Landis, plain
No. 13 B. & S. Univ. Cutter & Tool
No. 4—12"x66" Landis Universal
No. 70 Heald Internal
No. 1½ Landis, Internal
No. 25 Heald Rotary Surf.
No. 10 Blanchard, M.D.
No. 16-A Blanchard Surface
15"x17"x6', 8' Norton, O.S. surf., mag. chuck

MOTOR DRIVE NORTON GRINDERS

6"x32"	10"x96"
16"x18"	14"x36"
10"x24"	14"x50"
10"x36"	14"x72"
10"x50"	16"x50"
10"x72"	18"x96"
18"x144"	

Lathes, No. 3 Lodge & Shipley Duomatic
14"x 6' American, grd. hd., Taper Attach.
14"x 6' Lodge & Shipley
16"x 8' Lodge & Shipley, Taper Attach.
18"x 8' Lodge & Shipley, sel. grd. hd., T.A.
26"x14' L. & S., sel. grd. hd.
24"x10', 16" American
24"x12' Lodge & Shipley, sel. grd. hd.
25"x26' LeBlond Heavy Duty
26"x14' LeBlond Crankshaft
30"x20' American grd. hd.
36"x18' Lodge & Shipley, patent head
36"x30' Rahn Larmon, grd. head
54"x23' Johnson, triple geared
66"x21', 31', 39' Putnam, triple geared
Millers, No. 24 Hvy. Ohio, plain
No. 2, No. 3, No. 3-S Cincinnati, plain
No. 2-B, No. 3-B, No. 4-B, B. & S., plain
No. 3-B Milwaukee, plain
No. 4 Kempsmith Maxi-Miller, plain
No. 4 and No. 5 Cincinnati, plain
No. 1½, No. 2, No. 2-A B. & S. Universal
No. 2-BS Milwaukee Universal
No. 3, No. 4 Cincinnati Universal
No. 1½, No. 3-B Milwaukee Vert.
No. 2, No. 3 Cincinnati, H.P. Vert.
No. 4 Milwaukee Vert.
No. 5—48" Cincinnati Hydromatic
No. 4 and No. 8 Lees-Bradner Thread
Hanson Whitney Thread
24"x24"x12' Ingersoll Slab
36"x36"x12' Newton Duplex
38"x44"x20' Ingersoll Slab
48"x36"x16' Ingersoll Adj. Rail
Planers, 24"x24"x6' American
30"x30"x 6' and 18' Cincinnati
30"x30"x14' Gray, Arr. Rev., M.D.
36"x36"x12' and 24' Gray
36"x36"x 8', 12', 18' Cincinnati
36"x36"x14'—24' Cleveland Open Side
42"x42"x30' Niles-Bement-Pond, arr. rev., M.D.
48"x48"x10' Detrick & Harvey, O. S.
48"x48"x14' Liberty Open Side
48"x48"x16' Niles-Bement-Pond
60"x48"x16' Gray, arr. rev., M.D.
72"x60"x16' American
Presses, No. 106 Bliss Double Crank
No. 173-A Consolidated Dble. Crank
Shapers, 16" Gould & Eberhardt, M.D.
16" & 20" Stockbridge
20" & 24" Gould & Eberhardt
Turret Lathe No. 4 W. & S. Univ. Turret
No. 2-B Fester
No. 3 Cinn.-Acme, A.C. & B.F.
No. 3-A Warner & Swasey
No. 4-A Warner & Swasey 7¾" H.S.
No. 4-L Gisholt 9¼" H.S.

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DETRICK & HARVEY 5" bar

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BULLARD 24"
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NILES BEMENT POND 7-10" Extension
NILES BEMENT POND 42"—44"—51"—53"
POND 90"; 2 hds.
KING 60"; 2 swivel heads

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McCABE 27-49x16' Double Spindle
LODGE & SHIPLEY 24"x10' cone dr.
GREAVES KLUSMAN 16"x8' motor-in-base
LODGE & SHIPLEY 36"x16' grd. hd.

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ROWBOTTOM 24" Cam Milling Machine
CINCINNATI 24", 48" Automatic
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INGERSOLL 24"x24"x12', planer type
INGERSOLL 24"x24"x12', slab
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BROWN & SHARPE No. 4 Universal cone dr.
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HANSON & WHITNEY thread
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KEARNEY & TRECKER No. 1 Plain, standardized spdle.

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No. 0-3-⅛" Horizontal Boring Mill, s.p.d.

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NATCO C11 Drill—mechanical feeds
NATCO C13H Drill—hydraulic feeds
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CINCINNATI BICKFORD 5' full Univ.
CINCINNATI BICKFORD 6' Pla. SPD.
DRESES 3' and 5' Pl. SPD.
REED PRENTICE 4' Pl.
N.B.P. 8' Pl. SPD.

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BARBER & COLMAN Nos. 3 and 12 Gear Hobbers
BROWN & SHARPE No. 34 Gear Hobber
CLEVELAND 8 spdle. Spline Hobber
GLEASON 15" Spiral Bevel Gear Finisher
GLEASON 10" Spiral Bevel Gear
FELLOWS No. 8B Burnisher
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BRYANT No. 3 Internal
BLANCHARD Nos. 10, 16 surface
HEALD Nos. 50, 55, 60, 65 Intl.
HEALD No. 72 Hydr.; 72-A-3 Sizematic
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LANDIS 20"x10' Plain
LANDIS 20x132 cylindrical
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NORTON type B8I 14x30-36" crankpin
DIAMOND 84" Face
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SPRINGFIELD No. 7 Grinder

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TREADWELL 12" pipe mach.
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24" Cincinnati shaper planer
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5— ¼", No. 1 SDBS Waterbury Farrel headers
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1—1" H & G threader, model S.S.
1—1" Foote Burt 2 spindle threader
2—1" Landis 2 spindle threaders
1—1½" Geometric threader
1—1½" Landis 2 spindle threader
1—2" Acme model A threader
1—2" Landis 2 spindle threader
1—3" Acme model A threader

PRESSES

No. ½ Toledo OBI, bench
No. 19 Bliss OBI
No. C4 Ferracute OBI
30"x30"x12' Cleveland openside
32"x32"x12' Niles
36"x36"x 8' Gray
36"x36"x10' Cincinnati
36"x36"x12' Gray
36"x36"x16' Cleveland
48"x36"x10' Liberty openside

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7'2" Hilles & Jones, Motor Driven. Top Roll 13" dia. Bottom Rolls 10⅛" dia. Capacity ⅝" Plate
10' McCabe Motor Driven. Top Roll 10⅛" dia. Bottom Rolls 8¼" dia. Capacity ¼" Plate
20' Wickes, Motor Driven. Top Roll 20" dia. Bottom Rolls 14" dia. Capacity ⅝" Plate
26' Willamette, Motor Driven. Top Roll 28" dia. Bottom Rolls 20" dia. Capacity 1" Plate
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83½'x283½' with 28' Lean-to, equipped with 10 ton Niles 57' 3½" Span Crane, Motors 440 v. 3 ph. 60 c.
92' 2½"x176' with 89' 9½" Crane Runway

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48" McKay 17 Roll. All Gear Driven. Machine arranged for geared motor drive. Rolls 3⅛" dia. Capacity No. 16 gauge
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1200 ton Southwark Four Column, 48"x60" between columns, Slip Ring Motor Drive direct connected to Triplex Hydraulic Pump. Complete with Intensifier, High Pressure Piping and Valves

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OVERHEAD ELECTRIC TRAVELING

3 ton P. & H.,	29'6"	span, Motors 220/3/60
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10 ton Shaw,	47'4"	span, Motors 220/3/60
50 ton Shaw,	46'8"	span, Motors 440/3/60
7½ ton Bedford,	50'	span, Motors 220/3/60
15 ton Bedford,	50'	span, Motors 220/3/60
20 ton	50'	span, Motors 220/3/60
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15 ton Champion,	57'	span, Motors 440/3/60

CRANES—D.C.

35 ton Northern,	28'	span, Motors 220 volt DC
30 ton Niles,	31'8"	span, Motors 220 volt DC with two hoisting hooks
5 ton P. & H.,	37'0"	span, Motors 220 volt DC
7½ ton P. & H.,	38'6"	span, Motors 220 volt DC
5 ton Shaw,	40'	span, Motors 110 volt DC
20 ton Shaw,	55'	span, Motors 110 volt DC
15 ton Morgan,	60'	span, Motors 220 volt DC
25 ton Niles,	40'	span, Motors 220 volt DC
10 ton Morgan,	42'	span, Motors 220 volt DC
15 ton Whiting,	45'	span, Motors 220 volt DC
10 ton Morgan,	48'4"	span, Motors 220 volt
15 ton Shepard,	50'	span, Motors 220 volt
5 ton Alliance,	50'	span, Motors 220 volt
15 ton Bedford,	50'	span, Motors 220 volt DC
25 ton Morgan,	50'	span, Motors 220 volt DC
10 ton Cleveland,	58'2"	span, Motors 220 volt DC with two 5 ton trolleys
25 ton Morgan,	65'	span, Motors 230 volt DC 500' outdoor runway
25 ton Morgan,	65'	span, Motors 220 volt DC with smaller auxiliary hoist
25 ton P. & H.,	65'	span, Motors 220 volt DC wth 5 ton auxiliary hoist
40 ton Niles,	71'11"	span, Motors 220 volt DC with 5 ton auxiliary hoist
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75 ton 55'0" span, Four Girder Ladle Crane with Two Trolleys. 25 ton Auxiliary Hoist, 95% New, Late Type

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ROLLING MILL EQUIPMENT
4"x5" Torrington Single Stand, Two High Cold Rolling Mill, Motor Driven
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United Engr. & Fdry. Sheet Strip Coiling Machine, Motor Driven. Capacity 48" wide minimum in gauges .020 to .100. Equipped with tail kicking device and coil ejector. Produces coil 24" diameter

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1—No. 2 Cincinnati Vertical
1—No. 4 Cincinnati Vertical
1—No. 5 Cincinnati Plain
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1—No. 3-S Cincinnati Plain

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1—62" Niles Vertical
1—72" Niles Vertical
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1—56"x56"x14' Gray
1—48"x48"x18' Cincinnati, M.D.
1—48"x48"x18' Sellers, M.D.
1—48"x48"x14' N-B-Pond, M.D.
1—42"x42"x22' Cincinnati, M.D.
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GRINDER, No. 3 Abrasive, Surface
GRINDER, No. 70 Heald, Internal
GRINDER, No. 70 Heald Duplex, Double Spindle
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Drill—Pratt & Whitney No. 11 Mult. Spdle.
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Grinder—Queen City 16"x72" Pl. Cyl.
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Miller—Milwaukee No. 2½B Vertical
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6" Spindles N-B-P, floor plate 26'x10'. Also separate Milling Attachment, three motors of 220 V. DC. Weight 40 Tons. Excellent condition—Immediate shipment.

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6"x6"x¾" Kling Double Shaft, on turntable, MD.

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DIAMOND SURFACE GRINDER 15 x 50 BELT DRIVEN.
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BROWN & SHARPE No. 2-B PLAIN MILLER—BELTED MOTOR DRIVE.
CINCINNATI PLAIN MILLERS—No. 2 and 3 CONE DRIVE
AVEY BALL BEARING DRILLS—2 and 3 spdle No. 2 Taper.
CINCINNATI AUTOMATIC MILLER—24".

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
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FOR SALE
26" Type C Libby Turret Lathe
4½" dia. hole in spindle, complete with all regular equipment, 15 H. P. motor, belt drive. Used very little, in first class condition. Price reasonable.
THE BRODEN CONSTRUCTION COMPANY
CLEVELAND, OHIO.

26" x 120"
LANDIS GRINDER
Self Contained — Motor Drive
ROSENKRANZ WEISBECKER & CO., INC.
149 BROADWAY, N. Y. C.

OTT MACHINERY SPECIALS
Automatic Threading Lathe GH 13" x 6'
Cleveland No. 28E, SS Eccentric Twin Drive Press
Ferracute No. DDG4 Double Acting Cam Drawing Press
Gridley Automatics, ⅞, 1¼, 1¾, 2¼ & 2⅝" 4 spdle., Model F
Heald Cylinder Grinders, Nos. 50, 55, 60 & 65
Heald Internal Grinders, Nos. 70, 72 & 75
Heim Centerless Grinder, Serial 350, MD
Landis Plain Grinder, 10"x36" Self Cont'd
Lees Bradner Gear Hobbers, No. 1
Norton Plain Grinders, 6x32, 10x36 & 14x50"

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No. 8—Buffalo "Armor Plate" Bar Cutter—95% new.
11' Stoll Motor Driven Power Shear—capacity 14 Ga.
24" x 12' Lodge & Shipley Crank—Shaft Lathe.
30" x 30" x 10' Cleveland Open Side Planer, 3 heads.
48" x 48" x 12' Cleveland Open Side Planer, 2 heads.
Ingersoll Miller, 56" x 30" x 10', 4 heads.
No. 5-A Lees-Bradner Gear Generator.
No. ½—Buffalo "Universal" Iron Worker.

THE E. L ESSLEY MACHINERY CO.
829 Rees Street, Chicago, Ill.

24" Bullard New Era Vertical Boring Mill.
No. 3A Universal 3" Horizontal Boring Mill.
4 sp. Leland-Gifford H.S. Drill, 12" overhang, No. 3 taper, power feed on each spindle.
No. 14 Cochrane-Bly Duplex Universal Vertical Mill and Shaper, rotary table and dividing head.
No. 2 Kempsmith Maximiller, S.P.D.
No. 3 Oilgear Hydraulic Broaching Machine type, X.A.
16"x12' Sidney Geared Head, M.D. Lathe, T.A. & chucks.

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HONING MACHINE
Brand new Hutto Vertical Heavy Duty Hydraulic, Model 1-VH-1024, having a capacity up to 10" in diameter by 24" stroke length. Complete in every respect including electrical equipment.

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Hampden Avenue and 23rd Street, Baltimore, Md.

★ THE REASON ★
BEHIND THE RESULTS

The general superintendent of a large manufacturing plant sent us an unsolicited letter this week. Among other things he said, "There is not a week passes that we do not go through our issue of The Iron Age very carefully, particularly with reference to the advertisements and the Clearing House Section."

That is why advertisers in these pages get results!

600 TON TOLEDO KNUCKLE JOINT EMBOSSING PRESS.
MULTIPLE PUNCH: Long & Allstatter, 350 ton Cap. 10 ft. between housings.
DOUBLE ANGLE SHEARS: Kling 6"x6" x1"; 8"x8"x1".
PLATE PLANER: Hilles & Jones No. 4.
BULLDOZERS: Nos. 1, 2, 3, 4, 23, 25 and 26, also No. 24 Vertical Williams White.
UPSETTING and FORGING MACHINES: ¾" to 5".
5000 LB. ERIE DOUBLE FRAME FORGING HAMMER
NAZEL HAMMERS: Nos. 3B and 4B.
BUFFALO BAR SHEAR, No. 8 for rounds, flats, and structural shapes.
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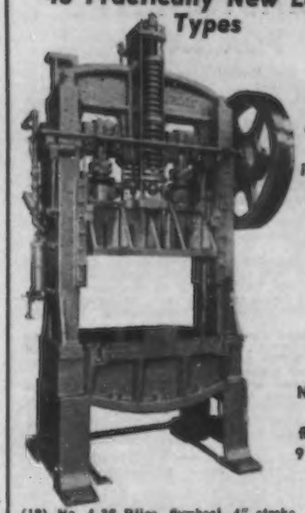
400 TON WHEEL PRESS
PRESSES: Solid Back and Incl. Nos. 1, 2, 3, and 4. Also Trimming Presses.
TENSILE TESTERS: 20,000, 40,000, 100,000, 200,000 and 300,000 lbs.
WIRE STRAIGHTENERS: ¼" to ⅝".
THREADING MACHINES: ¾" to 3", Single and Double Spindle, Lead Screws.
LANDIS 6" Pipe Threader, M.D.
D & K BENDING BRAKES: 10' x 3/16" and 10' x 16 ga. pan.
NIAGARA SHEAR: 10' x 16 ga.
YODER SLITTER: 36" x 16 ga.
AIR COMPRESSORS and SAND-BLASTS
HEAT TREATING FURNACES: Homo American Gas, S.C. & H. Rotary and Pusher Type.
BOLT, NUT and RIVET MACHINES: Cold and Hot Headers; Cold and Hot Nut Machines; Threaders; Trimmers; Thread Rollers; Slotters; Stud Threaders; Tappers; Burring Machines; etc.

DONAHUE STEEL PRODUCTS CO.
74th St. & Ashland Ave. Chicago, Ill.

FOR SALE
Model G, 40" Throat, Cleveland Punch, Complete with AC Motor. Weight Approximately 18,000 pounds.
W. J. Holliday & Co., Indianapolis, Ind.

DOUBLE CRANK TIEROD FRAME PRESSES

45 Practically New Latest Types



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No. 4-42 Bliss flywheel 9" stroke

(18) No. 4-36 Bliss, flywheel, 4" stroke
(4) No. 4-42 Bliss, flywheel, 9" stroke
(2) No. 4-42 Bliss, geared, 12" stroke
(2) No. 4-42 Bliss, geared 6" stroke with air cushions
(9) No. 4½-34 Bliss, flywheel, 6 or 9" stroke
(8) No. 4½-34 Bliss, flywheel, 6" stroke geared motor drive
(1) No. S-51 Ferracute, flywheel, 6" stroke
(1) No. 45-D-60 Cleveland, geared, 4" stroke
All purchased new in 1928 and 1929 and in excellent condition
We will back-gear any of the flywheel type if so desired

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471 North Fifth St., Philadelphia, Pa.

Foundry Equipment For Sale

on account of selling buildings for machinery warehouse. Machines in good working order.

S-31 Taber Power Squeeze 10" x 32" 18" x 18" table No. 4575
S-45 Pangborn Dust Arrester & Sandblast Equipment except barrel No. 332255
S-58 Sandblast barrel—Pangborn Company
S-99 K.T. 326-6-30 HP 1200 RPM 50 deg. 3 phase 60 cycle motor, serial No. 3078658—attached to dust collecter
S-204 Sand Mixer & Blender—Arcade Mall. Iron Co.
S-205 1½ ton air hoist
S-207 Royal Sand Separator & Blender Model "B" Royal Foundry & Machine Company
S-208 37"-25" International Moulding Machine, type F Jar Ramming, etc. International Moulding Machine Company
S-209 No. 2 Simpson Sand Sifter incl. foundation No. 17145
S-210 36" Casting Mill—includes set up
S-1 Taber Shockless Jar No. 12575 48" x 72" table, 13" cylinder—Taber Mfg. Co., Philadelphia, Pa.
S-8 Hermon Jar and Rollover 30" x 17" table—Hermon Pneumatic Machine Co., Pittsburgh, Pa.
S-13 Taber Jar 18" x 18" table, 3" cylinder
S-14 Taber Jar 18" x 18" table, 3" cylinder
S-21 Pridmore Power Rack over moulding machine 29" x 24" x 8"
S-34 16" x 6' Prentice Engine Lathe—Prentice Bros. Co.
S-35 10" Reed Wood Lathe—F. E. Reed Co.
S-37 36" Band Saw
S-38 22" Hand Feed Prentice Drill—Prentice Bros. Co.
S-39 Jig Saw—12"
S-40 Circular Saw
S-41 24" Sizing Plane No. 1064—Crescent Machine Co.
S-44 Imperial Hoist No. 827—4000 lb. Ingersoll-Rand Co.
S-57 Fan—B. F. Sturtevant No. 2—B. F. Sturtevant Co., Boston
S-77 3 ton Wall hoist
S-83 Two Imperial type 10 Air Compressors, right hand side 20655 P.P. Air Cylinder 14" x 12"—left hand size 20654 P.P. Air cylinder 9" x 12"—Ingersoll-Rand Co., New York
S-84 General Electric No. 7213A9 type 1-B-76-900 Form M (cycles 60) H. P. 7500—amp. 7315. Sec. Amp. 172—volts 550—speed no load 900—full load 865
S-85 No. 56H Ingersoll-Rand Core Breaker Hex Nozzle—No. 13566

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WORCESTER, MASS.

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BLISS, TOLEDO, V. & O. ETC.
REBUILT—GUARANTEED

JOSEPH **HYMAN** & SONS
Tioga, Livingston and Almond Streets
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3 Whiting 25 ton Bottom Tap Ladles with bail and bottom tapping mechanism. One just new, other two good condition. Blue prints and prices on request.

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INDUSTRIAL PLANTS ROLLING MILLS *and* EQUIPMENT
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Cable Address "FOSTER" Pittsburgh

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MACHINERY FOR
Tin Can Making and Metal Working
Wire Drawing, Forming, Straightening, Rivet, Nail and Bolt Making, etc.
Electric Spot, Butt and Seam Welders.
Power Presses of every description

NATIONAL MACHINERY EXCHANGE
"If it's Machinery—We Have It"
128-138 Mott St. New York, N. Y.

FOR SALE
BLISS BULLDOZER 300 TON CAPACITY

THE H. A. SMITH MACHINERY COMPANY
SYRACUSE, N. Y.

CAN MAKING MACHINERY

Bliss No. 820 Automatic Strip Feed Presses
McDonald No. 31 Automatic Strip Feed Presses
Lake Nash Slitter
Seamers—Bodymakers—Flangers—Slitters—Testers

R. & S. MACHINERY CO.
19 Howard St., New York City

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9 KW G E 3-60-220 alternator connected to gasoline engine
40 KVA CW 3-60-220 alternator
50 KW 125 volt D C generator
120 HP 220 volt 725 RPM D C motor
75 HP C W 220 volt 1260 RPM motor
35 HP 220 volt 500/1000 RPM D C motor

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1060 Broad St. Newark, N. J.

The Clearing House Brings Results.

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"We have sold practically all of the material advertised."

Use the Clearing House for selling used or surplus equipment.

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Double crank — Single gear
96" between uprights
12" stroke — 12" shut height
Belt driven through friction clutch

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FOR SALE
One, used "American" foundry sand cutter, 51 inch
One, used "American" foundry sand cutter, 44 inch

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IRONTON, OHIO

GUARANTEED *Rebuilt* **Welders**

Complete rebuilt, modern and performance-tested. REAL MONEY SAVING PRICES. Get full details and Low Prices from Moreo before you buy. Stock—all sizes—standard makes. We buy, sell, and exchange.

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IN PHILADELPHIA STOCK
SPOT WELDERS

(9) Thompson and Toledo 20 KW to 35 KVA, Throats 24 to 44", Watercooled points and Adjustable Lower Arms.

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Metal Working Machinery
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"Anything so long as it contains IRON or STEEL"

IRON & STEEL PRODUCTS, Inc.

BUYERS SELLERS TRADERS

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FOR SALE

CAR REPAIR PARTS
CARS and LOCOMOTIVES
30 TON GASOLINE LOCO. (or LOCOMOTIVE)
Whitcomb, S.G. 4-wheeled. Built 1930. Run only 2000 M. Vitrually 100% new.
WESTERN AIR DUMP CARS, S. G.
Three, 10-yd., built 1927, Steel, in unusually good condition.
Four, 12-yd., Wood, fair condition
Twelve, 20-yd., built 1920, Steel, good condition
Also, all other Capacities and Track Gauges
6½-YD.-ELECTRIC SHOVEL
BUCYRUS, 320-B, 2200/4000 volt, 3 ph., 60 cycles, A.C. 250 volt Ward-Leonard control. 90 ft. boom and 58 ft. dipper stick. Built in 1925 and used only two years, and in good condition. Located near Madisonville, Ky. Part cash, terms if necessary.
1½-ton SWINDELL ELEC. FCE.
Completely Overhauled. As Good as New.
BUILDINGS:
Truscon 50'x185'
Complete with steel sheeting, sash and doors. Easily re-erected.
New Shop Bldg. never erected, 445'x730'; five-section for 20-ton Cranes. Will split.
NEW G. E.; O. H. CRANE MOTORS
9, 50 HP; 8, 25 HP; 7, 20 HP; 3/60/440. Ball-bearing Slip-ring with Solenoid Brakes & Allen-Bradley controls.
Various other Motors, too, both A.C. and D.C.
BUILDINGS:
CRANES: O. H. GANTRY & LOCO.
Send for our latest Machy. & Equip. bulletin

WANTED

STEEL BUILDINGS
ANY SIZE OR LOCATION
CRANES:
OVERHEAD, GANTRY & LOCOMOTIVE
GANTRY CRANES:
10 to 15 ton 125' to 150' span with 30' to 40' cantilever one end 30' to 40' lift 230V. D.C. 7½ to 10 ton 200' to 225' span with 2 cantilevers, one 80' to 90'—other 50' to 60'. Lift 60' to 70' 230V. D.C.
CARS and LOCOMOTIVES
CAR REPAIR PARTS
SCRAP: TUNGSTEN BEARING
ELECTRIC FURNACES
FOR STEEL MELTING

STANDARD MILLING COMPANY
Box 928
Minneapolis, Minn.

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1 Link Belt Ash Handling equipment 350 ft. combination coal and ash handling elevator and conveyor 131 ft. long, 49 ft. rise, 24" link belt chain with 24x18" peck carriers, upper arm carried by 24" high cast iron stands 8 ft. on centers, with 6" angle steel support on bin frame. 20 lb. railroad iron track guides, 3—18"x34' steel spouts to storage. Subject to inspection where is as is
2 Worthington Steam Pumps 7½"x2x6 Hydraulic duplex iron fitted steam pumps each fitted with 1¼" Fisher pump governor. Serial number pumps 209656 and 211578
1 Knowles Steam Pump 7½x4½"x10" brass fitted duplex pump, outside packed with patent valve No. 179606
1 Gardener steam pump 7x4½x10" duplex brass fitted steam boiler feed pump outside packed with patent valve serial No. 56156
1 Worthington steam pump 7½"x4½"x10" duplex brass fitted, outside packed, pot valve pump, shop No. 744266
1 Ingersoll Rand compressor 12"x10"x10" steam and 12x10 air 12x10 Class F.R. single cylinder straight line steam driven air compressor with 3 feed automatic ratchet lubricator, shop No. 24113
1 Synder-Hughes 8"x4½"x10" duplex brass fitted steam pump shop No. 24400 with 1¼" Fisher pump governor
1 Hughes steam pump 7x4x8" duplex brass fitted steam pump shop No. 20871 with ¾" Squires regulating valve
1 Fairbanks Morse Fire pump 18"x10"x12" underwriters labeled steam driven pump No. 6095—1000 gal. per minute
1 National Air Compressor type No. 6 2 cylinder No. 32851 direct connected to 7½ h.p. Westinghouse induction motor type C.C.L. 3 phase 60 cycle 440 volt 1130 r.p.m. No. 1070488 with automatic electric type A Governor No. 1453.

READY FOR IMMEDIATE SHIPMENT

1—250 K.W. Ridgeway D.C. Generator, 250 Volt, 500 R.P.M.
1—100 K.W. General Electric 250 Volt D.C. motor generator, 3 bearing unit on cast iron base, 900 R.P.M.
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1—150 HP. General Electric Slipring Type 1—3 ph. 60 cycle 220 volt—720 R.P.M.
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1—100 HP. General Electric Type KT 356 3 ph. 60 cycle—900 R.P.M.
1—75 HP. Westinghouse Type CS—3 ph. —60 cycle 220 volt—1150 R.P.M.
1—60 HP. General Electric Type KT—3 ph. 60 cycle 220 volt—900 R.P.M.

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140 GRAND STREET, NEW YORK, N. Y.
New York City's Largest Stock

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1—28 x 48 Corliss engine, direct coupled to shaft.
1—600 B.H.P. Turbine (Low Pressure) 3600 Rev. geared to 103 Rev. for direct shaft drive.
This turbine operates from the exhaust steam (17 lbs.) from above Corliss engine complete with condenser and oil cooling system.
(13) boilers, some only used two years.
30 K.W. engine driven lighting unit.
1—84" Downingtown paper mill.

Plant located at Latrobe, Pa. (All assembled)
Representative on premises or communicate with

ISIDORE FRIED
71 West 23rd St., New York, N. Y.

SURPLUS MACHINERY AND MOTORS

	H.P.	Speed	Volts	Make	Price
2	400 3 ph.	60 cy.	500	2200 Westinghouse	$800
1	450 3 ph.	60 cy.	514	550 G.E. S.R.	950
5	15 D. C.	500/1000		550 G.E.	290
2	20 D. C.	500/1000		550 G.E.	340
1	Rock River Punch 48" Throat, Architectural Jaw. Price				850
1	50-Ton Industrial Bay City Wreck Crane				4,500
1	20-Ton Browning Loco. Crane.....				4,000
1	25-Ton Industrial Bay City Loco. Crane				5,000
1	20-Ton McMyler Loco. Crane.....				4,000
1	15-Ton Browning Loco. Crane.....				3,500

NOW IN OPERATION—A-1 CONDITION

1—15-Ton Morgan Crane 80'0" Span
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3200 Grand Avenue, Neville Island — Phone Federal 4300, Pittsburgh, Penna.

AIR COMPRESSORS

1300 ft. SULLIVAN WN-3, 100 lb.
20 and 12x14, motor driven, 3-60-220-440
1052 ft. ING.-RAND XRE-2, 100 lb.
18 and 11x14, motor driven, 3-60-440, 220
807 ft. SULLIVAN WN-3, 100 lb.
17 and 10½x12, motor driven 3-60-440
721 ft. I-R; ER-1, 17x10, idler 30 lb.
676 ft. CHGO-PNEU. OCE, 125 lb.
15 and 9x12, motor driven, 3-60-2300
528 ft. ING.-RAND, ER-1, 14x12, idler, 100 lb.
170 ft. WORTH. fthr. Valve, 8½x9, idler, 100 lb.
137 ft. SULLIVAN, WG-6, 8x8, idler, 120 lb.
173 ft. I-R, FR-1, steam, 9 and 9x8, 100 lb.

Others, all sizes and drives

INDUSTRIAL TRADING CORPORATION
30 Church Street — New York, N. Y.

A.C. MOTORS—3 Phase, 60 Cycle

H.P.	Make	Volts	Type	Speed
1500	G.E.	440/220	ATI-Synch.	180
500	G.E.	440	Synch.	1200
450	West.	440/220	Synch.	257
450/360	West.	2200	CW-Slipring	875/700
400	West.	2200	CW-Slipring	290
400	G.E.	4150/2300	MT-Slipring	390
400	West.	2300	CW-Slipring	514
300	Al. Chal.	2200	ANY-Slipring	585
300	West.	440/220	CW-Slipring	1800
250	G.E.	4000/2300	MT-Slipring	257
250	CR. WH.	440/220	12SQ-Slipring	435
250	West.	440/220	CW-Slipring	585
225	Elec. Mchry.	4150/2300	3-BRG.-Synch.	450
220	G.E.	440/220	ATI-Synch.	600

Large Stock of FULLY GUARANTEED a.c. and d.c. MOTORS—GENERATORS—TRANSFORMERS and ELECTRICAL EQUIPMENT

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USED STEAM AND ELECTRICAL EQUIPMENT

Steam Turbines, Motor Generator Sets, Belted and Direct Connected A.C. and D.C. Generating Units, Boilers, Rotary Converters, Motors, Transformers, Etc.

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1—25 Ton P. & H. Crane DC 65' span.
1—8 Ton Shaw Crane 110 DC 47' 7" span.
1—5 Ton Shepard Crane 110 DC 70' span.
1—10 Ton Box Crane DC 30' span.
1—8 Ton Champion Crane AC 59' span.
1—15 Ton Morgan Crane DC 60' span.
1—40 Ton Niles Crane DC 72' span.
3—15 Ton Shaw Cranes DC 50' span.
1—Putnam Car Wheel Borer.
1—400 Ton R.D. Wood Wheel Press.

SEVERIN MACHINERY CO.
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AIR COMPRESSORS
All Types and Sizes
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AIR COMPRESSORS
New and Remanufactured
Compressor Builders for 35 Years
In Stock at Our Plant—150 Modern Compressors
All Makes and Sizes—Shop Tested—Guaranteed

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18 Ton Orten & Steinbrenner Locomotive Crane, 50 foot Boom, equipped with one yard Bucket, first class condition and can be inspected under steam.

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807 ft. Ingersoll-Rand XCB, Belted.
676 ft. Ingersoll-Rand XCB, Belted.
540 ft. Ingersoll-Rand ERI, Belted.
9 Low Pres. 168 ft., 710 ft., 1200 ft.
2200 ft. Steam, Belted & Elec. Drives.

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WJ3 Sullivan, 694 cu. ft.
Ingersoll Rand, 446 cu. ft.
Elec. Motors 3/60/440—20 HP, 40 HP

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Brisbane Bldg. — Buffalo, N. Y.

LIFTING MAGNETS
22" 36" 43" 55"

We furnish completely rewound magnets guaranteed one year.
We buy, sell, rent and repair magnets.

GOODMAN ELECTRIC MACHINERY CO.
1060 Broad St. — Newark, N. J.

THE CLEARING HOUSE

Procurement Division, Public Buildings Branch, Washington, D. C., July 15, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Aug. 26, 1937, for construction of the U. S. P. O. at Delta, Colo. Upon application one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

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26—12 yd. Western Air or Hand Dump Cars
11—50 ton 40 ft. Flat Cars
8—50 ton 40 ft. Steel Gondolas
22—50 ton Steel Hopper Coal Cars
1—25 ton Browning Locomotive Crane
1—20 ton Ohio Locomotive Crane
2—40 ton Baldwin 4-Driver S.T. Locomotives
12—5 yd. 36" ga. Western Dump Cars
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Cars and Locomotives of all types.

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SURPLUS ¼" SOFT STEEL PLATE

Will Furnish Any Required Sizes Up to 12" x 48"

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FOR SALE

SAMPLE FREIGHT CARS

1—40-ton all steel automobile box car
1—50-ton composite convertible plow gondola ballast car
1—50-ton all steel center and side discharge gondola ballast car
1—50-ton composite side discharge gondola car

Prompt Delivery

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149 N. 9th ST. BROOKLYN, N. Y.

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Quality RAILS Service

All weights, with Splice Bars, Frogs and Switches, Bolts, Spikes, Tie Plates, Crossties

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20 Cranes—one plant, 3 to 40-tons capacity, 16'9" to 75'0" span, 220 vc. D.C.
1—5-ton Case, 3-motor, 65'3" span, box type girders, cage controlled, CO motors, 220 vc. D.C.
1—10-ton P. & H. Trolley, 2-motors, 9'0" spread, 40 HP motor on hoist, 6 HP on trolley, 220 vc. D.C.
2—35-ton Girders, 86'0" span.

Send Me Your Crane & Hoist Inquiries.
JAMES P. ARMEL, 925 Fulton Bldg., Pittsburgh, Pa.

Second Hand Wrought Iron and Steel **PIPE** Overhauled Rethreaded Coupled

All Sizes in Stock

Greenpoint Iron & Pipe Co., Inc.
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RAILS

All sections new and relaying rail, spikes, bolts, frogs, switches, contractors' cars, etc. Prices cheerfully quoted.

M. K. FRANK
480 Lexington Ave., New York City | 25 St. Nicholas Bldg., Pittsburgh, Penna.

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New and Rebuilt and Guaranteed

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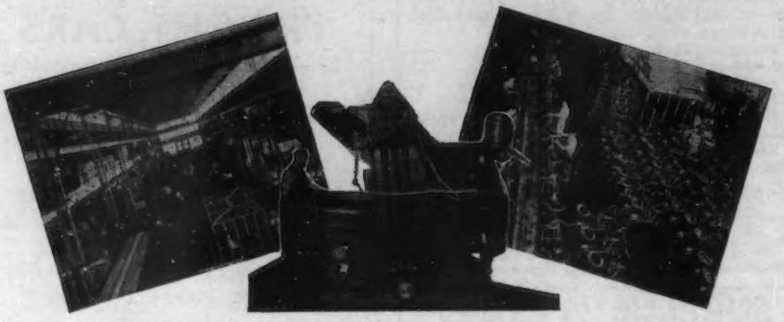

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THE MONTH OF VACATIONS

except for the Help Wanted Department of The Iron Age —it always works and works well, as the letters from our advertisers would indicate. They appreciatively tell us that The Iron Age does the work in getting the men they want.

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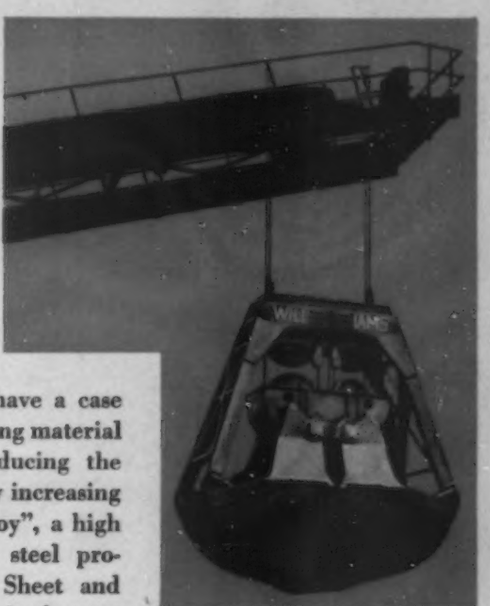
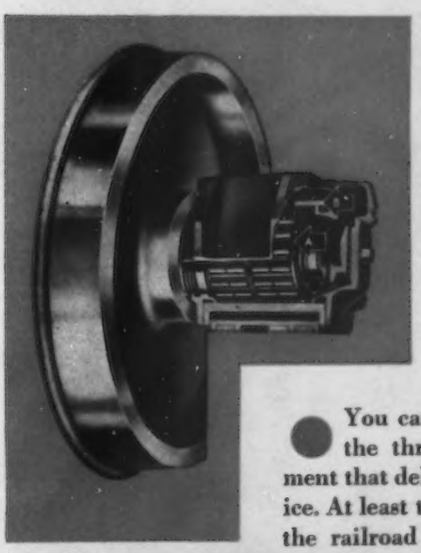
Shears off NEEDLESS COSTS *and* NEEDLESS WEIGHT

● The trouble with costs is you can't tell how much is *needless* until there's a basis for comparison. But here's one that ought to be interesting to every user of tool steels. The shear blade pictured above operating on hard alloy steel stock was formerly made of carbon tool steel. After cutting 200 to 500 pieces, however, the blades regularly became spalled or broke out at the edges. But after the Henry Disston Steel Works furnished blades made of their "827" medium carbon Nickel-chromium steel, the average service life jumped to 3,000 to 6,000 cuts between grinds with no spalling or breakage. Nickel steel not only sheared more parts but sheared off needless cost.



● Here at the right we have a case where the cost of handling material was appreciably cut by reducing the weight of equipment, thereby increasing the pay load. By using "Yoloy", a high tensile Nickel-copper alloy steel produced by the Youngstown Sheet and Tube Co., Youngstown, Ohio, in the construction of this large breakdown coal bucket, its pay load capacity was increased from 6 to 7 tons without increasing its gross weight.



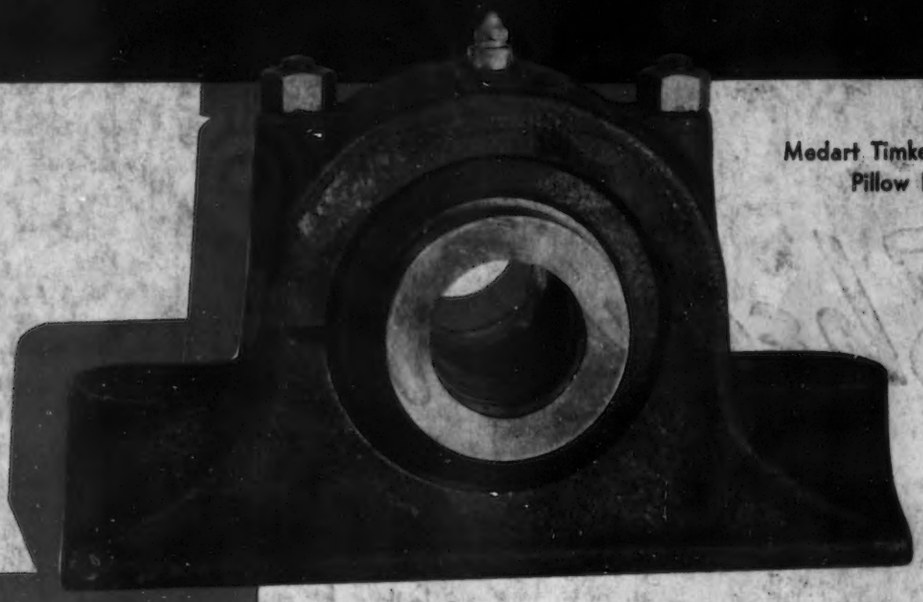
● You can't help but have respect for the thrift of transportation equipment that delivers a *million miles* of service. At least that much mileage is given by the railroad coach journal bearing pictured at the left, a type that is used by 24 leading railway lines and manufactured by The Fafnir Bearing Co., New Britain, Conn. Among the reasons are the inner race (A) made of shock-resisting Nickel-molybdenum carburizing steel and the housing bore (B) made of wear-resisting Nickel Cast Iron.

We invite consultation on the many ways in which the Nickel Alloy Steels will help to reduce operating and maintenance costs.

NICKEL
ALLOY STEELS

THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N.Y.

PROFITABLE POWER TRANSMISSION



Medart Timken-equipped Pillow Block.

Tapered Roller TIMKEN BEARING EQUIPPED

"Rebel" Streamliners of the Gulf, Mobile & Northern R. R. are Timken-equipped.

GLIDE—as you ride a Timken-equipped train

Power transmission units equipped with TIMKEN Bearings get the power to the job with the least possible loss and the greatest possible dependability. Furthermore, they do it with substantial reductions in lubrication and maintenance costs.

Timken-equipped line shaft hangers and pillow blocks provide a smooth path for power—unobstructed by friction and proof against wear.

Shafts are held in correct and constant alignment; radial, thrust and combined loads are carried without compromise; vibration and whip are reduced to the point of elimination.

When TIMKEN Bearings are used bearing closures can be made so tight that lubricant is retained indefinitely. This is not only a great economy but also a safeguard against product contamination or damage in many plants such as textile mills, paper mills and food product factories.

Obsolete power transmission equipment is a constant threat to profit. It will pay you to replace it now.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS